REMEMBERING JIM SMITH VE7FO

SARC

The Communicator

January—February 2023

PUBLICATION CONTACTS

COMMUNICATOR & BLOG EDITOR John Schouten VE7TI
communicator at ve7sar.net

SARC TELEPHONE 604-657-8753

CORRESPONDENCE 12144 - 57A Avenue
Surrey, BC V3X 2S3
SARC at ve7sar.net

CONTRIBUTING EDITORS John Brodie VA7XB
Kevin McQuiggin VE7ZD/KN7Q

The Communicator is a free electronic periodical published by Surrey Amateur Radio Communications in Surrey, B.C., Canada. All rights are reserved.

Our article reprint policy is on page 97

Issues appear bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

During non-publication months we encourage you to visit the Digital Communicator at **ve7sar.blogspot.ca**, which includes recent news, past issues of ***The Communicator***, our history, photos, videos and other information.

To subscribe, unsubscribe or change your address for e-mail delivery of this electronic journal, notify **communicator @ ve7sar.net**

If you find ***The Communicator*** worthwhile, regular readers who are not SARC members are invited to contribute a $5 annual donation towards our Field Day fund via PayPal.

SARC maintains a website at **www.ve7sar.net**

DEPARTMENTS

The rest of the story 4

RAC survey results 11

Field Day 2023 results 12

News you can lose —Ham humour 13

VE7ZD's radio ramblings 14

Daniel's workbench 24—42

Solder splatter 43

Satellite news 48

Tech topics 46

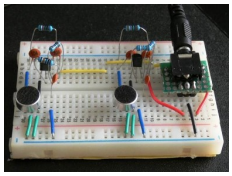
Columnists 50—86

Ham leftovers 71

Back To basics 72

Local SARC & SEPAR news 80—100

IN THIS ISSUE



Daniel Romila is back with several projects and information on a variety of electronics starting on page 24

Kevin VE7ZD reports from his new shack with Radio Ramblings

Lots of local news from SARC and SEPAR

…and so much more!

QRM -.-. --- .-. --

...from the Editor's Shack

Do you have a photo or bit of Ham news to share? An Interesting link?

Something to sell or something you are looking for?
eMail it to ***communicator at ve7sar.net*** *for inclusion in this publication.*

Happy New Year! The start of another year in Amateur Radio! Solar conditions are still improving and we have had some great results at our Operations and Training Centre (OTC) for the last few contests. Europe can be a challenge for us here on the west coast but it has been very satisfying, not only working most of Europe but also several countries in Africa. That includes South Africa, which is about as far away from us as you can venture. We have also noticed increased activity from the Far East including China, Korea and Thailand. Have a look at our contesting pages in this issue for further details.

Daniel VE7LCG has also been busy once again providing several articles on his latest experiments and Kevin VE7ZD/KN7Q wrote about his move from our area to Vancouver Island and the complexity of moving not only household furnishing but also his shack. Despite the move, Kevin assured us that he will continue to write for The Communicator and instruct in our successful on-line courses.

Our next on-line Canadian Basic Amateur Radio course starts mid-January and it continues to be well subscribed with both local students and students from elsewhere in Canada. We have also enjoyed having students from both the United States and Mexico, who now have their Canadian call sign. The technical details remain the same wherever you live but regulations and band plans do vary.

Enjoy this issue and we appreciate your feedback to let us know if there are other topics we should cover.

~ John VE7TI
Editor

This Month's Cover...

In this issue, a salute to one of our local greats. Jim Smith VE7FO became a silent key in November. We'll miss him..

"With the new year comes a refueled motivation to improve on the past one."—*Gretchen Bleiler*

On the Web

ve7sar.net

Between Communicators, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web and social media:

SARC Blog
ve7sar.blogspot.ca

Twitter
@ve7sar

FaceBook
SurreyAmateurRadio

Our YouTube Channel
SurreyARC

SARC Photo Albums
Web Albums
or
tinyurl.com/SARCphoto

The Rest Of The Story…

High flying inventor

William Lear

William Powell Lear (June 26, 1902 – May 14, 1978) was an American inventor and businessman. He is best known for founding Learjet, a manufacturer of business jets. He also invented the battery eliminator for the B battery, and developed the car radio and the 8-track cartridge, an audio tape system. Throughout his career of 46 years, Lear received over 140 patents.

Career

Lear was born on June 26, 1902, in Hannibal, Missouri to Ruben Marion Lear, a carpenter, and Gertrude Elizabeth Powell Lear. His mother left his father and he stayed with his aunt, Gussie Bornhouser, in Dubuque, Iowa. Later, Otto Kirmse took him in and raised him as his stepson. The family relocated to Chicago where Lear attended Kershaw Grammar School. On Sundays, he attended the Moody Tabernacle (now Moody Church). "From listening to Paul Rader, of the Moody Tabernacle, he learned grammar and how to speak. He found out how to meet people, how to shake hands, and what to say when he did so… He learned about hypocrisy, too", and ceased any further church affiliation.

While in Chicago, Lear was employed briefly at a local airfield. He spent one summer with his father in Tulsa, re-building a Model-T car. Too independent to move back with his mother in Chicago, Lear struck out cross country. After completing eighth grade, he joined the U.S. Navy at 16, lying about his age and was sent to Great Lakes Naval Training Station. After discharge, and with a young family, "he decided to complete his high school education. Starting a radio repair shop in his home, which he could tend nights, Lear enrolled at Tulsa Central High School, taking eight solids, heavy on the math. He was at the point of wrapping up the entire four-year curriculum in one, when he was again dismissed for showing up teachers."

Radio engineer

Lear was self-taught: “He had read widely on wireless, including the works of Nikola Tesla, the scientist/ inventor. He had even built a radio set, based on a twenty-five-cent Galena crystal which he sent away for, and he had learned the Morse code, the fun ending with the ban on radio during World War I.”

One of his first ventures was with Lawrence Sorensen, selling "Loose

Coupler" radios. Lear had been an "instructor in wireless" in the U.S. Navy so he confidently identified himself as a radio engineer to Clifford Reid in Quincy, Illinois. Reid was selling auto supplies and hired Lear to expand into radio.

In November 1922 with contractor Julius Buerkin he started Quincy Radio Laboratories. Buerkin financed the company and was president, while Lear supplied the knowledge and ran the day-to-day business. The company built speaker boxes for radios, custom built and repaired home radios, as well as sold parts. It eventually also built antennas. Lear hired Elmer Wavering to wire radios and Irving Johnson as manager. Lear also helped develop WLAL which evolved into the powerful station KVOO.

QRL was an innovator in that it was the first to offer a public workshop. Customers could buy parts from QRL and then use the workshop area to build their radio. Additionally, QRL was the first shop to offer home services, such as installation and repair and hook up of roof antennas, and to become a radio parts distributorship.

In 1924, he moved to Chicago and built a B-battery eliminator for the Universal Battery Company with R. D. Morey. He met Waldorf Astoria Smith of the Carter Radio Company who helped him with radio theory including Ohm's law. Tom Fletcher of the QRS Company was so impressed by Lear's radio set designed around a QRS rectifier tube that he hired him, offering 60% more pay than Universal Battery. Bill Grunow of the Grigsby-Grunow-Hinds Company topped that offer when Lear fixed a problem with 60,000 B-battery eliminators that they had manufactured. He came up with an invention in 1924 when power inverters installed at Stevens Hotel failed to perform for the Radio Manufacturers' Association.

Failing to secure the financial backing to produce the radio himself, Lear sold the radio to the Motorola Company in 1924.

Litz wire, extremely fine with 2-200 strands

In 1934 he designed a universal radio amplifier (i.e., one that would work with any radio.) The Radio Corporation of America purchased the plans, giving Lear the capital he needed to expand his operations. He founded the Lear Avia Corporation in 1934 to make radio and navigational devices for aircraft. In 1939 he founded Lear, Inc. By 1939 more than half the private airplanes in the United States were using Lear radio and navigational equipment. In World War II, the company manufactured cowl-flap motors and other precision devices for Allied aircraft. After World War II, Lear, Inc. introduced a new, miniaturized autopilot that could be used on small fighter aircraft.

Lear pioneered an early step toward miniaturization in electronics. Tuning coils in the radio frequency stage of a set were rather large; Lear reduced their size by using Litz wire, braided from many fine strands to create a large surface area, giving it high conductivity at radio frequency. Lear borrowed $5,000 from his friend Algot Olson to build machines to wrap the strands, braid the wire, and wind the coils. The industry was set up in the basement of his mother's old house on 65th street, and run with assistance of Don Mitchell, a railroad electrician. Lear called the company Radio Coil and Wire Corporation. Eugene F. McDonald of Zenith Electronics ordered 50,000 coils, which were one-quarter the size of coils made with solid wire.

Lear traded his Radio Coil business for one-third interest in Paul Galvin's Galvin Manufacturing

An antique crystal 'loose coupler' radio

Company. At that time the radio had not yet been developed for use in automobiles. Lear worked with his friend Elmer Wavering to build the first car radio. Lear partnered with Howard Gates of Zenith; Lear designed the circuit and layout, Gates did the metal work, and Lear completed the assembly. Galvin initially dismissed the prototype, but later ordered a 200-unit production run. Galvin and Lear mulled over names for the product on a cross-country trip and came up with "Motorola", which was a portmanteau of "motor" and the then popular suffix "-ola" used with audio equipment of the time (for example "Victrola"). The product was such a success that Galvin changed the name of his entire company to Motorola.

Aviation

In 1931, Lear bought his first aircraft, a Fleet biplane for $2,500 from a woman in Dearborn, Michigan. The challenges of aerial navigation led Lear into the development of radio direction finders and avionics products.

Lear founded Lear Developments, a company specializing in aerospace instruments and electronics. Lear developed radio direction finders, autopilots, and the first fully automatic aircraft landing system. He was awarded the Collier Trophy for this contribution in 1949.

Lear also developed and marketed a line of panel-mounted radios for general aviation. His "LearAvian" series of portable radios, which incorporated radio direction finder circuits as well as broadcast band coverage, were especially popular. The company earned about $100 million during WW II for its products.

Lear changed the name of Lear Developments to Lear Incorporated and in 1949 opened a manufacturing facility in Santa Monica, California.

In 1960, Lear moved to Switzerland and founded the Swiss American Aviation Company (SAAC). The company's goal was to redesign the FFA P-16 jet fighter—a project that had been abandoned after two crashes during test flights—into a small business jet, the SAAC.

During the brief existence of SAAC, King Michael I of Romania met Lear and agreed to work as a test pilot for the Swiss part of the company. This was during the king's forced exile, which lasted for 50 years until 1997.

In 1962, Lear sold his interest in Lear Incorporated to the Siegler Corporation after failing to persuade Lear Incorporated's board to go into the aircraft manu-facturing business. The resulting company was thereafter known as Lear Siegler.

Lear next moved to Wichita, Kansas, to manufacture the converted SAAC 23 design. In October 1963, Lear Jet started test flights on the Learjet 23, the first mass-produced business jet. The first Lear Jet was sold in 1963; it could carry eight passengers at 560 mph and cost about $650,000 fully equipped, about $400,000 less than its competitors at the time. Although the Lear Jet was quite successful and remains in production, Bill Lear was eventually forced to sell Lear Jet Corporation to the Gates Rubber Company in 1967 due to other financial losses.

In the early 1970s, Lear backed the Foxjet ST600 with its first order. The Very Light Jet project failed, but the VLJ concept became popular again 30 years later.

In 1976, Lear sold an option to his LearStar concept to Canadair, a Montreal aircraft manufacturer. The idea was to design an executive aircraft which would bring together a supercritical wing with Lycoming's new turbofan engine. However, the concept was only a very rough outline, prepared by a consultant. Although Canadair took up its option, Lear eventually realized that the Canadians had simply been interested in using his reputation and skills at promotion to penetrate the market. Canadair's design had little relation to Lear's concept, and Lear had no role in its development. Nevertheless, the Canadair Challenger business jet was to have a long career, with several variants. Bombardier Aerospace, by that time the parent company of Canadair, acquired Lear Jet in 1990.

One of Lear's most innovative projects was his last — a revolutionary aircraft called the LearAvia Lear Fan 2100, a seven-passenger aircraft whose single pusher propeller was powered by two turbine engines. The fuselage of this aircraft was made of lightweight composite materials, instead of the more typical aluminum alloys. The Lear Fan was ultimately never completed; at the time of his death Lear asked his wife, Moya, to finish it. With the help of investors she attempted to do so, but the aircraft failed to obtain FAA certification and so was never put into production.

Other notable inventions

The 8-track tape

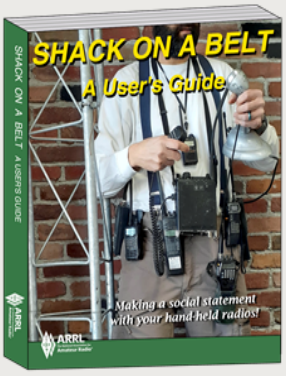
Lear developed the 8-track tape music cartridge in 1964. Lear's invention was an improvement on the four track Muntz Stereo-Pak tape cartridge, marketed by Earl "Madman" Muntz in California in 1962, itself a version of a 3-track system, Fidelipac. The 8-track was a commercial success that provided good audio quality and was easily adapted to vehicle and home use. The Lear Jet Stereo 8 Division offered home, auto, and portable versions. A popular theory is that Learjets also included an 8-track players. In 1965, a partnership between Ford, RCA, and Lear offered the first pre-recorded 8 -track music cartridges. RCA released the first Stereo 8 Tape Cartridges in September 1965, issuing 175 titles.

The 8-track tape

In 1968, Lear started work on a closed circuit steam turbine to power cars and buses. He built a transit bus, and converted a Chevrolet Monte Carlo sedan to use this turbine system. It used a proprietary working fluid dubbed Learium, possibly a chlorofluorocarbon similar to DuPont Freon. A prototype racing car was built to enter the 1969 Indianapolis 500, the Lear Vapordyne. The car never entered the race and never ran at competitive speeds

~

New ARRL Publication: Shack on a Belt: A User's Guide



Get the most out of hand held radios! This guide explains the nuances of using multiple rigs simultaneously, with topics such as:

- Keeping your pants up.
- Managing long counterpoises.
- Walking a yagi on a tall mast.
- Coping with public shaming and antenna envy.

Get yours now!

Our hobby…

~Dwayne Rea KA0AAM

What is an Elmer to you?

Do you remember your first Elmer? Many of you can, but some of you may not have an Elmer.

Some may ask:
"What is an Elmer?"
"Why have an Elmer if you can do it yourself?"

Others may ask:
"Why can't I have an Elmer?"
"Who would like to be my Elmer?"

Others may comment:
"My Elmer is a Silent Key, I miss him dearly"
"My Elmer is in a Home of some kind, no longer capable of Ham Radio"

I lost track of my Elmer, because… (insert reason… grew up, moved away, got out of radio at one point and lost track, and the list goes on).

"My Elmer and I still enjoy talking to each other" "I have several Elmers" (The Best Kind in my books, am I allowed to be just a little selfish? *[Very big GRIN!])*

Whatever your reason or comment is, a Elmer is that blessed person that stops all forward movement, shakes hands with you, brushes aside a spot on the table, whips out the soldering iron or paper, pulls all those neat gadgets out of this drawer that has mysterious capabilities of being endless supplies, and somehow helps us put our ideas and thoughts into working order. WOW!!! -- If that isn't a mouthful.
Well guess what, I was blessed with more than one Elmer. When you are 13 years old, you are a little on the naive side, but your mind wants to play with electronics and make things work.

Let me tell you a little about my Elmers… I was young, loved playing with electricity. I figured out how to make "Worm Finders", because I enjoyed fishing. I hated digging for worms, and somehow (can't remember how I learned), I discovered that sending electricity into the ground would cause worms to come to the surface. Presto! Instant bait! No hassle of digging! Best of all… it used ELECTRICITY!

I shamefully admit that I purchased a Cuss Band, "lessor" known as a CB. It was fascinating to me. I attached it to my 10 speed bike and off I went. I soon became friends with my neighbor up the road by accident. He was an older Gent (to me), but he was interested in Ham Radio Himself. Together we studied. Morse Code was easy for me… I was at 20 wpm in nothing flat. We both took the Novice test, and sadly I flunked. But, I knew why I flunked when I took the test. I learned about "key" words and the tricks used in the questions, and

about 6 months later I took it again… passed with flying colors.

Unfortunately, this Gent passed away within a year. Was this guy an Elmer? In my books yes! He started me on the road to success, took me under his wing, walked with me through my studying, helped me learn Morse code, helped me take my first test, and did this under his own free will…the will to help. He may not have been a ham at the time, but he became a ham, the kind of ham I am so very proud to know!

Through this ordeal, I received a novice license, a S-38, and a Eico 720. Within a year, I was riding my Bike and saw this massive antenna. It looked like NASA's dream come true antenna. It towered above the house and high into the sky. It was so big, that Turkeys could roost on it, mistaking it for a huge Elm Tree. And what did this youngster do? I marched right up to the door, knocked on it, and blurted out: "Are you a Ham?"

My real lessons in Ham started that day. This crazy guy invited me into his house, brought me into a "Man-Cave", sat me down in front of this radio, and started introducing me to these people on the air. After about an hour, he asked me what I wanted to build. I just said the first thing that came to my mind: "An Amplifier". What kind of an Amplifier? My Elmer said! Well heck!!! I didn't know! I just wanted to Amplify SOMETHING, I don't care what it was, I wanted to see something amplified! Not only that, it seems that everything I studied dealt with SOME kind of Amplifier, thus that MUST be an important step!

My Elmer pulled this thing called a breadboard out of a drawer (You know, that drawer that magically has everything…), and together we made a simple Amplifier. Then I got the bright idea of making a transmitter. THAT is only an amplifier with feedback. My Elmer smiled, gave me about 10 components, sent me home, and off I went.

I started using my knowledge, and finally got together this one transistor transmitter/ Oscillator.
The coils? Hell, I didn't know how many turns! I just "guessed". The Capacitor? Hell, I didn't know how big, I guessed.
I sure as heck knew what a tuned circuit was! So I put two and two together, soldered it all up and brought it to my Elmer.

And here comes some more magic out of that Drawer of his, It is called a Grid Dip meter. HE Magically put this thingy-ma-jig on top of it, held it next to my ugly wired mess, and said "It is about 14 megahertz." (Darn, I missed the novice band… by quite a bit) But, when we powered it up, I was able to make MORSE CODE!!! Not only that, the tone of that Morse code was so fantastic, that every bird within hearing distance thought I was calling them in to reproduce!

About a year later, and a REAL Homemade Crystal controlled transmitter later, this Elmer passed away. In comes my third Elmer. This guy pulls me aside, teaches me about antennas, coils, and things that are beyond my imagination. We had the most

wonderful relationship for many decades. I grew up helping him with computers, towers, antenna's, and fixing his radio's. I grew up enjoying a wonderful day each week with him and his family. I also grew up weeping his loss as I went to his wife's funeral… later weeping the loss of him.

But the most important thing of all, is that each of these special Elmer's brought me one step closer to what Ham radio is all about. They brought me one step closer with a helping hand. They brought me one step closer with a smile on their faces. They backed me up, watched me make errors, corrected my mistakes, and supported me in my wonderful journey throughout the years.

And now, I can happily repay back my Elmer's by being an Elmer to other newcomers. As I repay my debt, I realize the emotional joy that my Elmer's had when they saw me growing up and making mistakes as I learned. I can laugh inside, as I see the same mistakes I have made in the past, being made again by my student. I can lend the helping hand and knowledge to make my student understand why that Knight t-150 has a 3 prong plug on it, instead of a 2 prong plug that can accidentally be flipped around, making that chassis a hot 120 volts to touch. (I had to add this for us old timers who, probably more than once, been zinged with 120 volts for not replacing that cord like we should have done, with a three prong ground cord).

For those who "do not have" an Elmer, Try asking for one… You only have to walk up to a Ham and ask for help, the handshake is only seconds away.

For those who "have" one, you are blessed. You are blessed with help, a patient person, a wonderful friend, and a lifelong experience.

For those who "had" one, the memories will always be cherished in our minds. We can enjoy the memories, pass them down to our students or friends in Ham radio, and be thankful that there are people out there that step up to the plate without question, and stand beside us as we learn what ham radio is all about.

For those who do not have an specific Elmer, or want one? You are probably like me. My main Elmer's have passed away, but I have met some may wonderful hams that I can call Elmer's. I personally do not want to single out just one. Singling out just one would insult all the others, because each and every one of them are a true blessing to me. One will help with transmitters, the other receivers, the other antenna's, the other computer, the left over Elmer's fill in all the other gaps that I can't think of while writing this article.

This is what being an Elmer is all about in my books, how about yours?

~ Dwayne KA0AAM

Radio Amateurs of Canada

Canadian Amateurs Call Sign Policy Survey

The January-February 2023 Radio Amateurs of Canada TCA magazine is now available at RAC.CA

In August and September 2022, Radio Amateurs of Canada conducted an online survey open to all Canadian Radio Amateurs. The survey focused on the policy related to call signs, but also covered some other matters.

Over 2,300 people participated from every province and territory of Canada.

The raw data from the survey has been compiled and is now available on the RAC website. Dr Frank Howell, K4FMH, volunteered his skills in survey methods and analysis to produce a report organizing your responses. Frank's analysis is also available on the RAC website in a PDF document.

The RAC Executive and Board will work together to produce a series of recommendations for changes and updates to the call sign policy based on your input. Once approved by the RAC Board, we will present our recommendations to our regulator – Innovation Science and Economic Development Canada (ISED) – at the next meeting of the Canadian Amateur Radio Advisory Board (CARAB) sometime in 2023. ISED will then decide which recommendations to implement and when to do so.

If you have any questions or comments, please contact RAC Regulatory Affairs Officer Dave Goodwin, VE3KG, at regulatory@rac.ca and also the RAC Director for your region.

Phil McBride, VA3QR
RAC President

Dave Goodwin, VE3KG
RAC Regulatory Affairs Officer

Raw Data as Excel spreadsheets

English surveys received

French surveys received

Review of Results from RAC Call Sign Survey 2022

"Policy Issues Relating to Amateur Radio Call Signs in Canada" by Dr Frank Howell, K4FMH:

High quality (3.5 MB)

Reduced size (1.8 MB)

~ *RAC*

Page 12 – News You Can't Lose

2022 ARRL Field Day results are in

The 2022 ARRL Field Day showed a return to pre-COVID environments, with more relaxed protocols for social gatherings. There were modest participation increases in portable (Classes A and B), mobile (Class C), and Emergency Operations Center, or EOC (Class F), station activations.

Despite the event weekend offering poorer propagation than usual, nearly 5,000 entries were submitted from ARRL and Canadian Sections, plus entries from several DX countries.

Due to many areas of the country loosening restrictions on gatherings in public spaces, there was an increase in the number of groups that participated as Class A (portable stations with a three or more person club or non-club group) and Class B (portable stations with a one or two person club or non-club group) entries, comprising over 37.1% of the total number of entries. Other mobile stations operating as Class C, as well as EOC stations in Class F, represented another 4.4% of portable (field) participation.

Class D (home stations, commercial power) and Class E (home stations, emergency power) represented the remaining 58.5% (down from 67% of the total entries in 2021).

According to ARRL, this year, there were a total of 4,929 entries submitted (including checklogs), and a reported total of 29,679 participants. While the total number of entries decreased by 17.5% over 2021, the total number of participants increased by 11%, with the number of participants rebounding toward pre-pandemic numbers (there were 36,420 participants in 2019).

So how did we fare as SARC and SEPAR?

1st in Canada and 9th overall in 2F

2F

Bullitt ARS					
KY4KY (+W4KBR)	1,646	2	20	6,996	KY
Point Loma ARC					
W6A	1,393	2	12	6,174	SDG
Orleans Co. ARC					
W2ORC (+WA2DQL)	1,763	2	26	5,864	WNY
Coventry EMA					
KC1CUE	1,279	2	21	4,898	RI
Rappahannock ARA					
W4NNK	1,089	2	18	4,886	VA
WCARES Contest Grp.					
N4FR	1,364	2	20	4,806	TN
RICOMU/RIEMA					
WA1USA	1,230	2	7	4,432	RI
Alachua EOC Radio Club					
NF4AC (+NF4RC)	702	2	26	4,172	NFL
Surrey Amateur Radio Comm.					
VE7SAR (+VE7HME)	1,014	2	20	4,080	BC

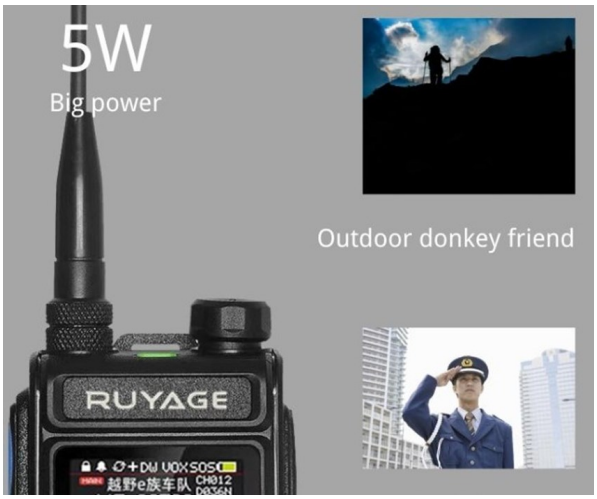
As you can see, a very good showing once again. Congratulations and thank you to all those who contributed.

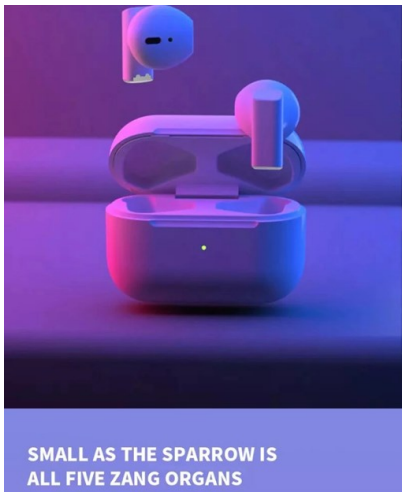
~ *ARRL*

Page 13–News You Can Lose

The Lighter Side of Amateur Radio

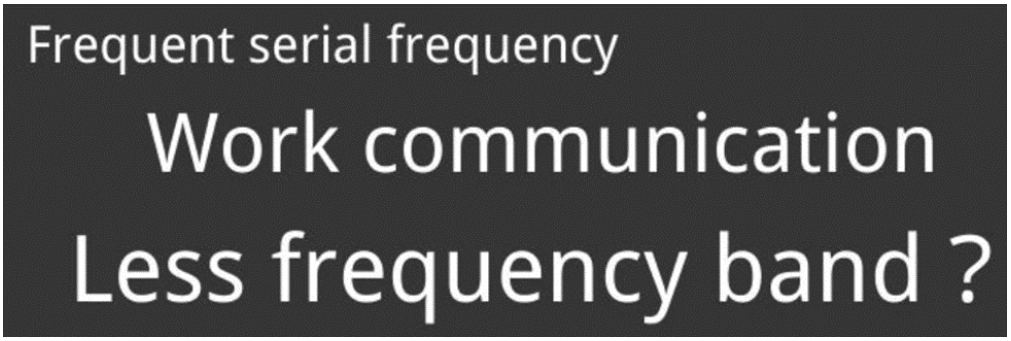
Funny English technical translations





Frequent SARC Communicator contributor Daniel Romila VE7LCG helped a friend buy some products online. He had to explain that many products are fine and the strange English presentation is just the result of a funny machine translation process. Daniel has shared some of them.

Click on some of the photos for a link to the site.



[Below] Features: The modern new electronic tube that completely surpasses the antique gallbladder, not only the HIFI performance, but also the charm, which are very excellent.

[Left and below] When a product is so good you feel like hanging yourself. It took me a while to understand what I'm supposed to do with the rope.

Radio Ramblings

Kevin McQuiggin VE7ZD/KN7Q

On the move…

The past couple of months have been very busy at VE7ZD. After 41 years at the same QTH in Burnaby, VE7LPM and I made the decision: we sold our house, pulled up stakes, and moved to a new home in Courtenay, on Vancouver Island. I've traded ***CN89lf*** for ***CN79mp*** and can report that I am now operational on HF and 6m with QRP (low power) with a (marginal performance) longwire antenna. See Figure 1. It's a minimalist station, but at least I'm on the air. I plan to make improvements starting in the spring and into the summer. We have lots of tall trees, so I am hoping to get some wire antennas "way, way up" for excellent HF capability.

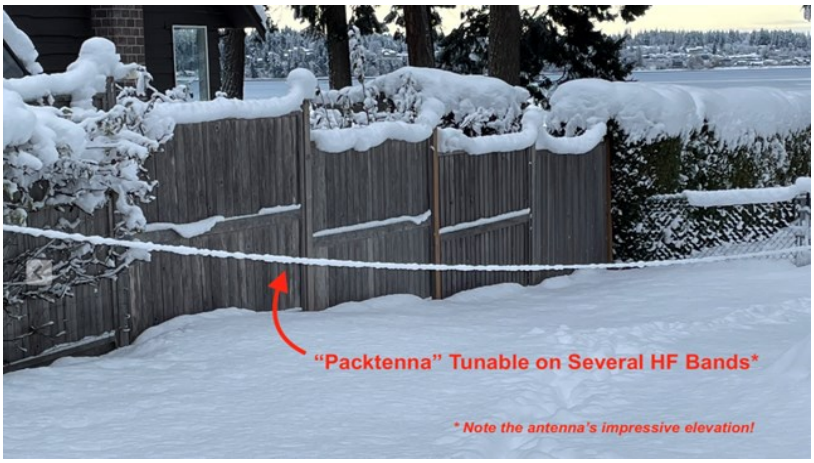


Figure 1 – VE7ZD Operational in CN79mp

The move was a huge project, and for this column I'd like to focus on the specifics of moving your shack, antennas, and related equipment to a new QTH.

I'll also provide an update on the ongoing high-precision rotator controller project that I am working on with my friend AC7FT, and discuss a new open-source digital signal processing (DSP) package called "Liquid DSP".

Moving: Not as Simple as it Sounds

In concept, moving your shack is simple: pack up your gear and move it to the new QTH, where you unpack, set up the rig, erect an antenna and (presto!) you're on the air.

In practise, however, there is much more to this process.

Radio shacks are complex technical installations with many operational, physical, electrical, and regulatory requirements. Every shack is different, but the commonality is that each shack needs to suit the operator's preferences and operating goals. Within this objective,

the individual components that make up the ham station need to be connected in a functional manner. Each piece of gear needs ground and power, but it also has (possibly several) inputs and outputs. Devices interface with each other and need to be connected properly. My HF transceiver has 27 connectors on its back panel, although I am using only about half of them: how do we keep track of all these interconnections?

We have all struggled with getting the cabling right to allow our radio to communicate with the shack computer, or to get CAT control working on our rig, or to get the rig to properly control our external tuner or power amplifier. Antenna switches need to be connected to each antenna, to ground for safety, and to the input of our rig, or to our SWR and/or power meters. Every station needs a reliable ground bus. Getting "everything that needs to be connected" properly connected to everything else can be a complex problem. We can anticipate some issues and plan to address them, but the interconnection process usually does not proceed quite as smoothly as we would like.

Generally, when we come across these problems, we solve them (sometimes with many hours of head-scratching, research and trial and error), and then - when the configuration actually works – we breathe a sigh of relief and jump on the air to use our new radio or device.

Human nature being what it is, we usually don't document the problem or its solution. We promptly forget what we did, and the reasons why we cabled the devices together in a particular order, or why we set certain parameters in a particular way. We get on with operating because that is what amateur radio is all about. This can generate problems a few years later when you need to disassemble your shack.

How will you get everything back together again – in a functional manner?

When you move your shack, you need to control the tendency to simply pull all the gear apart and pack the components into moving boxes, thinking that "I'll just put it all back together in the new QTH".

Documentation and Move Planning

It is important to document the shack's working configuration before you start pulling gear apart. Like the typical ham, I lacked documentation as to how (and why) I had connected the station components together.

Before our house move, I reviewed how each component was connected to the other components in the shack. I used my smartphone to take photographs of the cabling and interconnections between each piece of gear and the other components to which it was connected. See some of these photos in Figure 2.

One shack will differ from the next, so this documentation is not definitive – you will have to adapt the connections in your new shack to its own physical environment - but having a record of how all the gear was connected in the previous shack will provide insight when you need to adapt the equipment to your new shack's working environment. Ideally, you will have an opportunity to improve the station layout and performance as well!

Figure 2 – Documenting Interconnections

Disassembly

Once I had documented the interconnections between all the devices in my shack, I began to slowly take the station apart. This should be a methodical process, and components should be clearly labelled as to where they are located and what they connect to, especially if there is any potential ambiguity in this.

One tip is to package each item of equipment with its associated power supply or power connections. I had several pieces of gear powered either by 12 VDC or via "wall warts" (AC adapters). There are so many combinations of voltages and current capacities in AC adapters that it is hard to keep everything straight. Which adapter goes with which device?

Keeping the correct AC adapter with each piece of equipment ensured that I would not have to dig through a pile of a dozen wall warts to figure out which adapter went with each unit. Murphy's Law dictates that if you take this approach, you will get it wrong, choose the wrong voltage for a particular component and fry at least one device!

I generally took the same approach with the 12 VDC "Powerpole" cables that powered some devices. Some were colour-coded, but most were not. In the new shack the power cable lengths will usually change, but at least I would have the proper connector and gauge of wire and would have a record of how each piece of gear went into the power distribution boxes in a high-level manner. Documentation and photographs helped a lot.

Figure 3 – Dust Accumulation

I took the same approach with CAT cables and the coaxial cable jumpers that interconnected rigs to preamplifiers, meters, and linear amplifiers. Coupled with the previously shot photographs I am confident that I will minimize confusion when I eventually move to get, say, my 23cm power amplifier reconnected to the IC -9700 radio.

The ground bus, the 12 VDC buses, the 120 VAC long power bars and UPSes in my old shack were complex to disassemble, and I found much inefficiency in the way the spiderweb of line cords had grown over the course of 20+ years of use. I will be able to streamline and greatly improve these systems when I get to full reassembly of my shack over the next year or so.

My shack was not big in comparison to those of die-hard contesters or DXers, but it took a full day of effort to document and disassemble the various components and to pack them safely in boxes for transport.

Another tip: use the disassembly process as an opportunity to clean your equipment. There was an incredible amount of dust that had accumulated at the rear of rigs, switches, power supplies and other equipment. Look at the dust at my transceiver's exhaust fan in Figure 3. "Windex" and a pack of microfibre dust cloths were close at hand and I spruced up every device and cable as I disconnected it in the old shack. The new shack will start out on a "squeaky clean" footing! [2]

Antennas

Next was disassembly of the antennas. If you have any sort of an antenna farm, then the logistics of taking down the antennas, disassembly, packing and transporting them can consume a considerable amount of time. Don't underestimate the amount of effort that this will take.

Figure 4 – Antennas at CN89lf

In my case, I had a short tower supporting a 6m Yagi, two dipoles, a vertical antenna, and a 1.5-metre post with rotators on top that supported the 2.4m dish I use for 23 cm EME. See Figure 4. I also had a few decades' worth of antenna parts: old (but still deployable) antennas and supports, rotators, hardware, and the like. These parts were scattered about the house: in the basement, under our back step, and at the back of our yard behind the garden shed.

As the timeline for our move was pretty short (we had about 7 weeks to vacate our house) the logistics of antenna removal worried me, as there was an awful lot to do, and some of it I could not do on my own.

The wire antennas were easy to remove. They have the benefit of being small and light when coiled up, plus they are easy to transport. The vertical (a pole with a 2m/70cm vertical on top) similarly came down without much problem, but while the antenna itself was small, the 6m aluminum support pole presented a transport challenge. The dish mount was, similarly, easy to disassemble but there was a lot of cabling (coax and rotator cables; power cables) associated with the mount. The dish itself was collapsible so that was not a problem.

The biggest antenna issue was the 35-foot tower and the 6-element 6m Yagi on top of it.

With the assistance of SARC members John VA7XB and John VE7TI I was able to climb the tower and remove the 6m Yagi in a couple of hours. Thanks John and John for the able ground assistance! We got the Yagi to the ground in one piece, and it disassembled into a nice compact "pile of parts" for transport (see Figure 6).

Figure 5 – The Parabolic Antenna Packed in its Carrying Bag

The tower was another issue. While it was short (just four sections) no one in the local amateur radio community has a suitable "gin pole" for the style of tower that I had installed. While the club has a gin pole, its support legs did not mate with the rung spacing on my tower.

Figure 6 – Disassembled 6m Yagi

I would not be able to disassemble the top three sections and lower them safely to the ground myself without either a helper on the tower or a functional gin pole.

As we were on a tight timeline to vacate the old house, there was no time to purchase a gin pole, build one, or the like. I made the decision to hire a commercial radio tower service to remove the tower sections. This was not expensive and the two technicians who arrived got the sections disassembled and safely to the ground in just over an hour. While not optimal (I would have rather found a gin pole and done it myself) it was one of those tradeoffs that need to be made in a house move with fixed deadlines.

Culling:

Once all the antenna hardware was down and the shack was disassembled, I had to make some serious decisions as to what to keep, and what to dispose of. I had to do a bit of downsizing. Keeping it all was not an option.

I had way too much test gear (some of it quite dated), radio equipment, spares, antennas, books, and even furniture to consider taking it all to the new QTH. We would have needed an additional moving truck!

Figure 6 – "New" Bookcases for the OTC!

Given the overall complexity of the move there wasn't enough time to sell the extra furniture and equipment, so I decided to donate several of the items to individuals and organizations. A lot of the test equipment, antenna spares, and some nice antennas, furniture and related gear was donated to SARC for eventual use within the OTC, at Field Day, or in similar good causes.

Thanks to John VA7XB, Steve VE7SXM, John VE7TI and others for accepting my donations of equipment and furniture for the club! I hope that SARC can put this stuff to good use.

The Big Day

October 25th arrived very quickly, and between the moving company with their excellent crew, and a group of our friends who arrived to help Laura and I fill a 26-foot U-Haul rental truck, we got everything loaded and ready for the move to Courtenay on October 28th. See Figure 7. Please disregard the anxious look on my face as I fueled the (gas-guzzling) vehicle! We transported all the sensitive computer and radio equipment ourselves to ensure that it would be moved without mishap. The disassembled "antenna farm" also went into the U-Haul. It was tight, but we got it all in!

Figure 7 – Fueling the 26' U-Haul.

The move itself went smoothly, as did the "disgorging" of the U-Haul, and by Saturday the 29th I was able to return the rental truck all swept-out and shiny as when I had picked it up.

A sea of boxes filled our new house and garage, and we got to work unpacking. Despite trying to label all the boxes thoroughly, we had the usual post-move trouble finding stuff, and the next ten days were challenging as we tried to locate the coffee maker and other mission-critical devices of daily life.

I eventually found all the boxes with the radio gear and after a couple of weeks work on general household set-up I was able to find my Elecraft KX3, erect a longwire antenna (Figure 1; tied to a shrub outside the basement door) and get back on the air with 5 watts QRP on November 13th. My first QSO was on 20m with JA0PE.

The new QTH is fantastic from a radio perspective, and the noise floor on HF and into VHF/UHF is about 20 to 30 dB lower than what I had been accustomed to in Burnaby. This is probably because we moved from the city to a semi-rural environment: lower population density, fewer RFI-generating devices, greater distance between homes. I can hear signals now that I never could have heard before. I am looking forward to some radio fun over the winter and into the spring! EME from the new QTH should be fantastic.

Update: Precision Rotator Controller

In a previous column I described a new azimuth/elevation rotator controller that I am working on with my friend Dennis AC7FT, who lives in Portland, OR. This device is microcontroller based and interfaces to the world via Ethernet rather than through a rotator control box with the usual paddle switches or knobs. A recent photo of the controller, which is comprised of a CPU board, a motor board, and a power supply, is shown in Figure 8.

This networked approach has many advantages, as a control box is not needed and the firmware in the controller can connect to all sorts of physical rotator devices. Feedback loops and advanced firmware can steer the azimuth and elevation drives at very high precision. The use of TCP/IP as a control channel introduces significant flexibility. A tracking program can command the controller over the LAN (or over the Internet), making a manual control box superfluous.

I have written about the important role of learning and experimentation in amateur radio in this column before. Dennis and I are designing and building this device purely out of personal interest, to learn more about the underlying technologies. Personally, I have already learned a lot about mathematics, geometry and physics as well as the capabilities of the real time operating system "FreeRTOS" (discussed in a previous column [2]) that runs on the device's microcontroller [3].

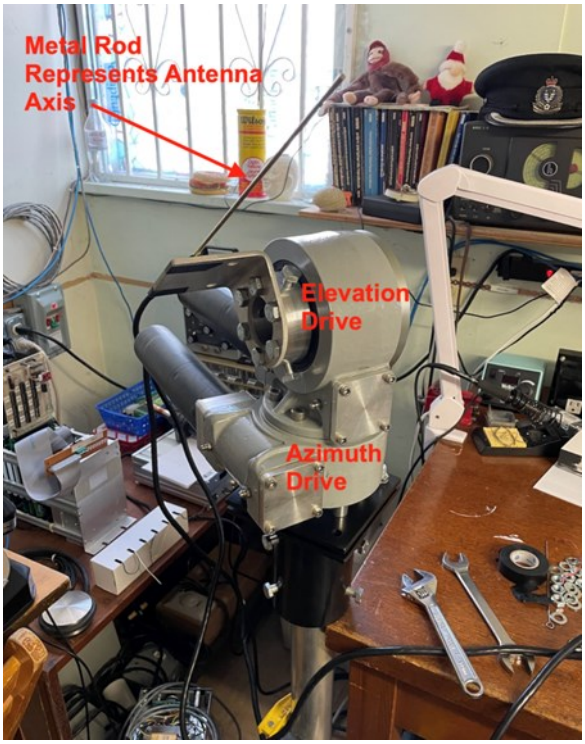
The operational objective of the project is to maximize precision in pointing our EME antennas at the moon as it makes its daily passes in the sky. I can report that the controller is working very well, and that we have deployed it to successfully track the moon and receive 23 cm EME signals. Figure 9 shows the dual-axis slew drive and controller undergoing testing in Burnaby. A short metal rod is standing in for the parabolic antenna's central axis.

Figure 8 – The Rotator Controller Prototype

Tracking is under software control, so I have also used the controller with my home-written tracking software to track the sun as well as the moon (Figure 10). In the future I would like to get involved in the international "Amateur Deep Space Network" project and track signals from space probes in orbit around Mars and the other inner planets. One needs very accurate antenna tracking for this.

The measured precision of our controller, which we are using with a heavy duty, dual axis "slew" drive, is 0.04 degrees. This represents a significant increase from the pointing accuracy I had before with my commercial rotator controller. Accuracy of that controller and drive combination was about 10 degrees, so our new rotator controller's precision is about 250 times greater.

Figure 9 – Slew Drive Testing



Liquid DSP

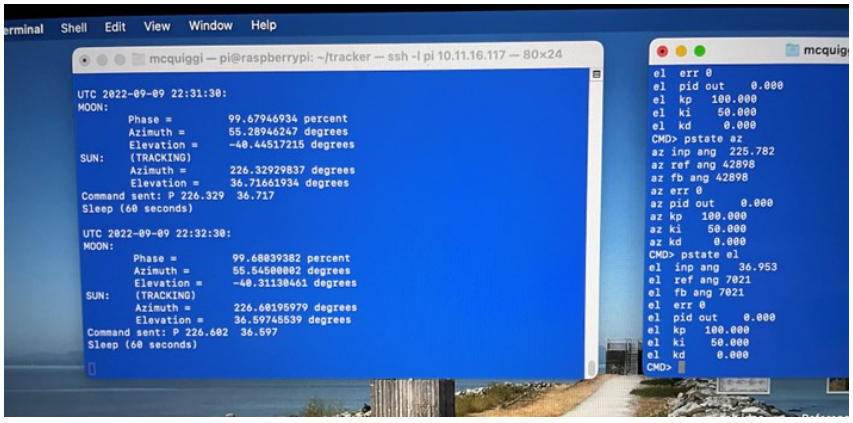
Lastly, I'd like to describe an interesting software-defined radio function library that I first heard of last September.

Liquid DSP is an open-source package of digital signal processing routines that are callable from the C programming language. It has a web page at https://liquidsdr.org/. Liquid DSP has most of the features of the popular gnuradio package [4] but has much less processing overhead because it does not provide a GUI (graphical user interface). Using Liquid DSP is a bit more complicated than gnuradio, but not by much. The functionality is the same and it is possible to write SDR (software-defined radio) radio receivers and transmitters that perform well in a small number of lines of code.

The lack of a GUI means that Liquid DSP is a bit harder to learn than gnuradio, but for those users with a fair level of experience with SDRs it offers considerable benefits because the radio code does not depend on any other software packages.

For those new to SDR and digital signal processing (DSP), or those who are not familiar with C, I would still highly recommend gnuradio: the GUI and the "drag and drop" features of gnuradio's desktop make it an excellent tool to learn about building radios in software.

Figure 10 – Software Driving the Slew Drives



New to the Liquid DSP package, I wanted to learn about it and see if I could build an FM broadcast receiver. An FM receiver is the "go to" first application for new users in gnuradio as well, because it provides easy feedback on whether the radio is receiving or not. Testing is easy: if the FM receiver isn't working, then the audio output is garbled. This seemed like a good place to start.

Think of a radio receiver's block diagram: signals are received, filtered, demodulated, and then amplified. Then they're sent to the radio's speaker for our listening enjoyment. A generalized block diagram for a superheterodyne receiver is shown in Figure 11.

In an SDR these steps take place as well, but the output of the system is a digital audio stream that gets sent to our computer's speakers. The SDR program receives a block of digital samples from the RF input, processes them to generate the demodulated audio stream, and then moves on to a new block of samples.

SDR code needs an additional step where the sample rate of the received data stream needs to be decimated - reduced from its higher rate used for RF sampling, typically on the order of 1,000,000 to 20,000,000 samples per second, to 48,000 samples per second (the audio sample rate) - because this lower sample rate is what the computer's sound card expects as input.

It took a few days of reading the Liquid DSP documentation and brushing up on my basic knowledge of SDRs to reach initial success. After a couple of false starts and a bit of bug-fixing I had a working FM receiver. I found that after setup of the filters, FM demodulator and other components the receiver ran in a small loop of only about 6 statements. This was very efficient! See Figure 12, it shows the simplicity of the receive-filter-demodulate loop. You don't have to be able to read C to be impressed with the efficiency of the operations.

In the early versions of my test program, I wrote the audio stream to a disk file rather than sending it to the speakers. This was just simpler than trying to listen to the audio stream immediately – I wanted to walk (or maybe crawl!) before I tried to run. I let the radio (i.e. the SDR) run for a minute, stopped the program, and was then able to play the output audio file using a media player to listen to what the station had been broadcasting. Once this process was working, I extended the program to allow me to listen to the audio stream in real time.

My goal, however, was to write an SDR receiver that receives SSB signals rather than broadcast FM signals. With an SDR, such a change is easy: all I had to do was change the demodulator from FM to SSB.

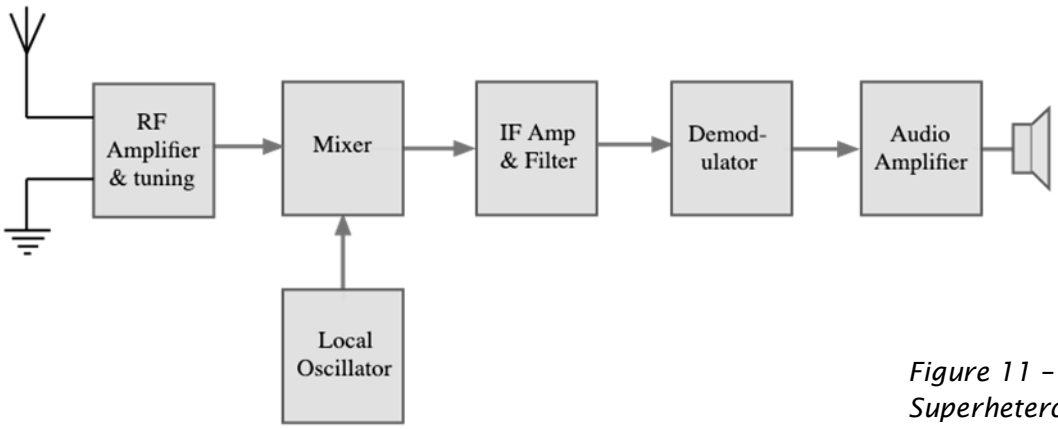


Figure 11 – Block Diagram of a Superheterodyne Receiver, From [5]

```
// Read samples in blocks of 100,000 and process them:
while(!feof(fin)) {
    n=fread(&iq, sizeof(float complex), BLOCKSIZE, fin);                  // READ
    nco_crcf_mix_block_down(mixer, iq, iq2, n);                           // TRANSLATE
    firfilt_crcf_execute_block(filter, iq2, n, iq2);                      // FILTER
    freqdem_demodulate_block(demodulator, iq2, n, demod);                 // DEMODULATE
    firdecim_rrrf_execute_block(decimator, demod, n/20, decimated);       // DECIMATE
    fwrite(&decimated, sizeof(float), n/20, fout);                        // WRITE
}
```

Figure 12 – Simplicity of an SDR Receive Loop

There were some other minor setup changes in the program prior the "tight loop" depicted in Figure 12 above, but, essentially, I just swapped out the single line of code that calls Liquid DSP's 'freqmodem_demodulate' routine (an FM demodulator) for a similar line that calls the 'ampmodem_demodulate' (amplitude demodulation) function instead. An additional parameter to 'ampmodem_demodulate' specifies whether you want AM, USB or LSB demodulation to take place. I now had an SSB receiver. How convenient!

We are fortunate that packages such as Liquid DSP and gnuradio take care of all the details for us. If you want to really understand the details of signal processing and how these modulations and demodulations take place in DSP, there are several excellent introductory books on this that I have mentioned before in this column. See [6] for some great resources for us as hams. A big part of amateur radio is lifelong learning.

My point in this somewhat lengthy discussion is to emphasize the uniformity of radio receivers and the fact that whether AM or FM, or SSB or digital modulation, HF or microwave, that all receivers (analog AND digital) operate in the same basic manner. The same for transmitters, filters, antennas and other "tools of the trade" for amateur radio. Once you understand the foundational ideas, these concepts translate to other frequencies, modes, and applications.

Next Steps with Liquid DSP

I have further improved the basic SSB receiver so that it sends the demodulated audio stream over the network. I can listen to the stream on any computer on my LAN or over the Internet.

The next step for the SSB receiver is to link the network audio output stream to the popular WSJT-X package so that it can receive FT8 or Q65 audio input directly. I will then be able to put my physical SDR radio (an Ettus B200) right at the EME parabolic dish antenna and eliminate the need to have an expensive and dedicated commercial radio connected to the dish via expensive coaxial cable or hardline. Loss between the dish feed and the SDR's input RF port will be minimal. I will be able to use inexpensive CAT5 cable between the dish and my computer in the shack running WSJT-X instead.

Once I am able to receive and decode Q65 EME signals I will move to implement the transmit side. My Ettus B200 SDR can transmit as well, so I will have to figure out TX/RX switching and how to handle it in my code. I will also have to account for Doppler shift and move the transmit and receive frequencies on both the TX and RX

References:

[1] It would probably be a good idea to remove equipment covers and dust/vacuum inside the equipment as well!

[2] FreeRTOS is available at https://www.freertos.org.

[3] See "Radio Ramblings" in the November-December 2021 issue of The Communicator: https://bit.ly/SARC21NovDec

[4] I have discussed gnuradio at length in previous columns. The project's web site is at https://gnuradio.org. A great place to start to learn all about gnuradio and SDRs is https://wiki.gnuradio.org/index.php/Tutorials!

[5] Diagram from https://www.electronics-notes.com/articles/radio/superheterodyne-receiver/basics.php.

[6] A free book on digital signal processing called "The Scientist and Engineer's Guide to Digital Signal Processing" by Steven W. Smith, Ph.D. is available at http://www.dspguide.com/. Highly recommended. I liked it so much that I bought a hardcopy! If you prefer video tutorials, then Michael Scott's series of training videos is also excellent. They are on YouTube, starting with lesson 1 at https://www.youtube.com/watch?v=zNUCiGVJQo0.

sides of the SDR to account for it. Fortunately, WSJT-X computes Doppler frequencies as part of its EME functionality: I will just have to figure out how to get these values into my SDR receive and transmit chains. I'll report back in a future issue as to how the project is going.

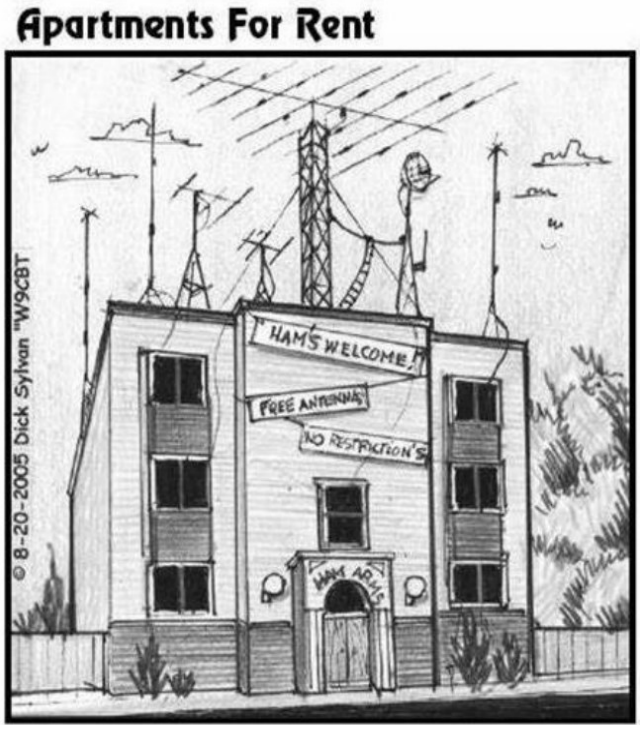
Conclusion

That's it for this issue. I hope that everyone had an enjoyable and fun holiday season and that 2023 is a good and productive year for all. I'm looking forward to better weather so that I can get an HF dipole and my parabolic antenna deployed and get back on 23 cm EME.

Feedback, including questions on this article can be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Thanks for reading!

73,

~ Kevin VE7ZD / KN7Q



"Looking for an apartment where you can put up an antenna? - Dream on."

Daniel Romila VE7LCG

Daniel's Workbench

An antenna amplifier with SPF5043z

Like many of my projects, this RF antenna amplifier project started from a mystery and "conspiracy theory" existing on the Internet regarding the SPF5189z and SPF5043z devices. Users/builders launched a very heated debate about "original" and "fake" devices; the originals would consume under 50 mAmps, while the fake ones would consume over 240 mAmps. I can tell you now, without the need for you to read the whole article, that the good devices indeed consume under 50 mAmps, and the burnt ones, the brand-new ones power supplied by users without protecting the input consume over 240 mAmps. There is absolutely no connection to who made the devices, but with who is using these devices and how.

SPF5043z is made by QORVO, and it is a high-performance GaAs pHEMT MMIC LNA designed for operation from 50 MHz to 4000 MHz.

Specifications:

- 0.8 dB Ultra-Low Noise Figure at 900 MHz
- 18.2 dB Gain at 900 MHz
- 35 dBm OIP3 High Linearity at 1900 MHz
- 22.7 dBm P1dB at 1900 MHz
- 3 V to 5 V Flexible, Single -Supply Operation
- 46mA IDQ, Adjustable
- Broadband Internal Matching

From my tests the user can count on almost 20 dB (10 times voltage amplification) in the 28 MHz band, 50 MHz, 144 MHz and around 160 MHz where the weather channels are.

SPF5189z is still sold, but it is no longer manufactured, at least not by QORVO. The SPF5189Z is a high performance pHEMT Low-Noise MMIC amplifier designed for operation from 50MHz to 4000MHz. It is easier to solder SPF5189z than SPF5043z.

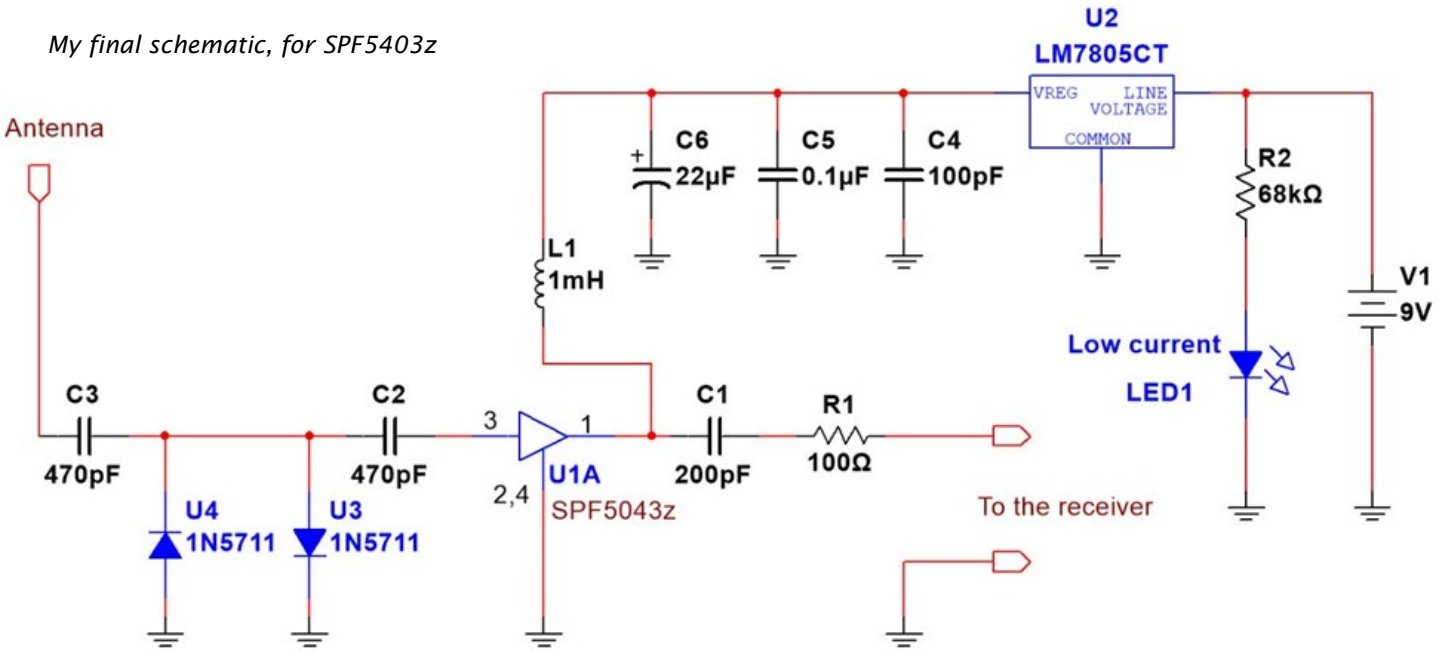
Specifications:

- Ultra-Low Noise Figure 0.60dB at 900MHz
- Gain 18.7dB at 900MHz
- High Linearity;
- Output IP3 +39.5dBm at 1960MHz
- P1dB +22.7dBm at 1960MHz
- Single DC Supply Operation +5V 90mA
- Flexible DC Supply Options +3V to +5V
- Broadband Internal Matching

SOT-89 Package

One YouTuber posted videos of tests 7 days in a row with his already built SPF5189z amplifier, days in which I am sure the amplifier was already

My final schematic, for SPF5403z



burnt, at the moment he supplied power to it: https://www.youtube.com/watch?v=UCGwS0ZcYP4

My modifications here, different than listed in the datasheet:

- Protection with two diodes at the input. When I powered the circuit on without them the consumption jumped a hundred milliamps, and I was lucky to disconnect it in time. The device is so sensitive that even parasitic signals kill it.
- The output has a 100 Ohm resistor in series with the 200 pF capacitor. Depending on what I connected after the amplifier determined if the resistor was needed or not. Without the 100 Ohm the amplifier self-oscillated. The amplification was lower and less stable with 47 Ohm than with 68 Ohm. 100 Ohm seems to be the magic value it wants.
- I connected a big 1 mH molded inductor towards the plus rail, with the hope of using the amplifier at even lower frequencies than the declared 50 MHz from the datasheet. I obtained 7X (16.9 dB) amplification at 28.197 MHz (VE7MTY CW beacon). It does not want to work at lower frequencies.

I made a YouTube video, while discussing my experiments with builders from other countries: https://www.youtube.com/watch?v=cQ7nTyqOdZw. It is only 4 minutes, and interesting from the video is how the consumption varies by simply moving a hand above the circuit. This gives an idea of how easily the SPF devices can be burned out.

I was forced to use a kind of cage construction and I also used a separation wall between the input and output:

Initially, when I started, I was more optimistic about keeping SPF5043z out of self-oscillation, and I even hoped I could connect two such devices, one after the other *[first photo next page]*.

My initial overly optimistic hopes died when I started the practical tests. One can buy such amplifiers already made from aliexpress.com. None of them has protection diodes at the input, and users report high current consumption in their reviews. That actually means that they are reporting that they had

already burned out the amplifier. They connected it, and immediately burned it out.

The project and article would not be complete without some practical results. I used an RSP1 Chinese clone as SDR receiver and SDR Uno software for measurements (which was never intended for extremely precise measurements).

When I wrote that I measured the signal without the amplifier that means the amplifier was not present in the path of the signal at all. I am amazed how some YouTubers say: “without amplifier” and leave all the cables connected to the amplifier, when they just disconnect the power supply. No, that does not mean without the amplifier, and it does not represent the situation without the amplifier out of the circuit. That is just a wrong way of representing the amplifier as being better than really is.

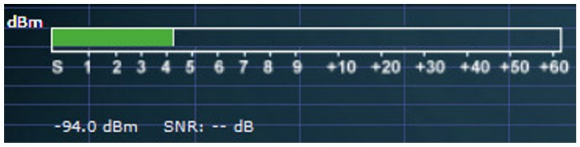
I also wanted to put some pictures of receiving only noise and compare that with and without the amplifier in the signal’s path, with a short at the antenna input(s), but these SPF components have so little noise that it cannot be seen with an SDR Uno. Here are my measurements in the graphic at the bottom of this page.

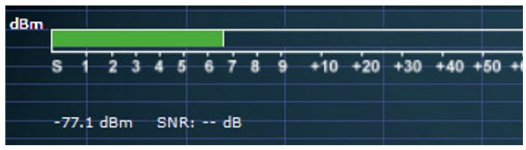
While I had absolutely no intention of using this amplifier, after making it for debating purposes, and only with other builders, I found that it is useful. Somehow, I feel sorry I did not build it nicer, but it is a box, and the inside does not need to be seen. It is rock solid.

My conclusion is to seriously take into consideration protecting such SPF devices, like all other RF antenna preamplifiers, with two diodes connected in antiparallel. One should watch the consumption from the moment of supplying power and to be ready to disconnect it immediately if too much current is measured.

~ Daniel VE7LCG

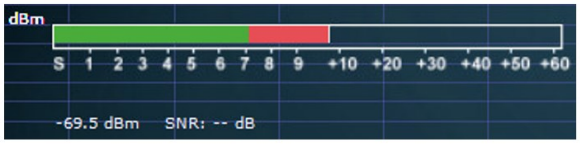
28.197 MHz





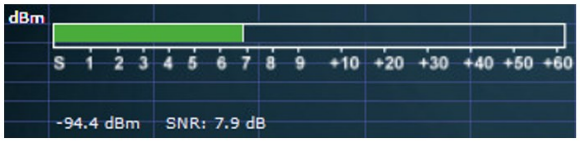
16.9 dB (7 X)

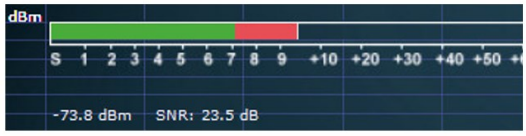
101.7 MHz



18.7 dB (8.6 X)

162.400 MHz

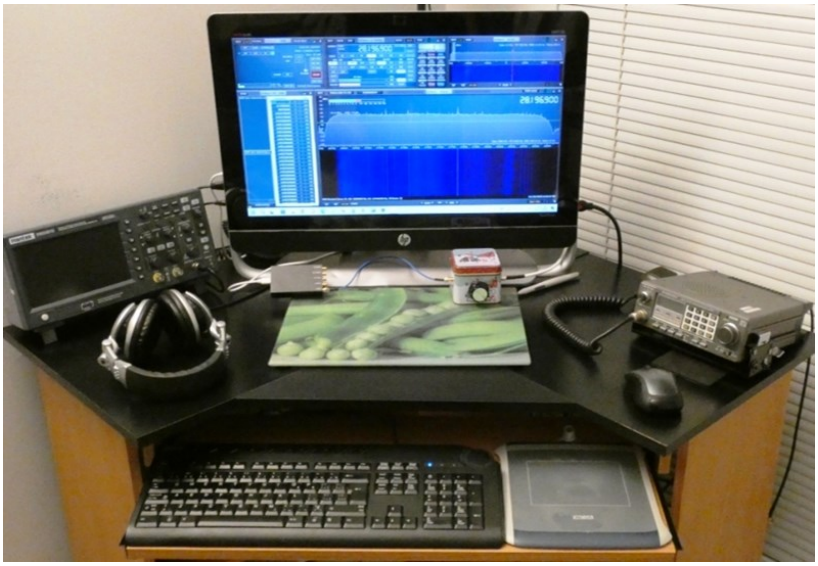




20.6 dB (10.7 X)

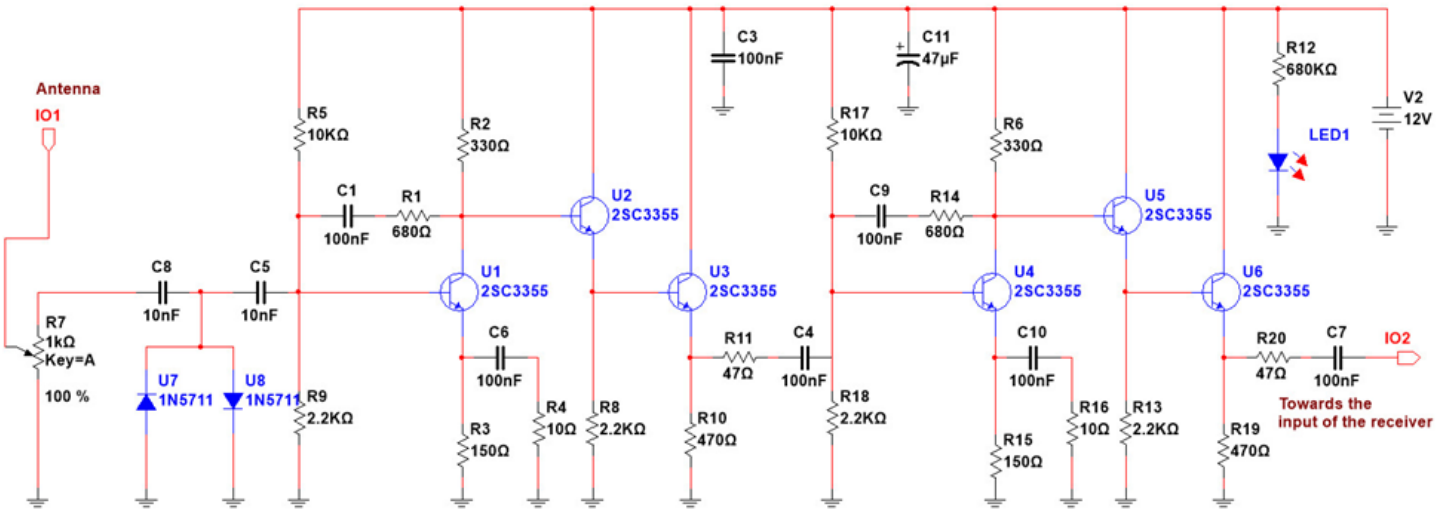
...more from

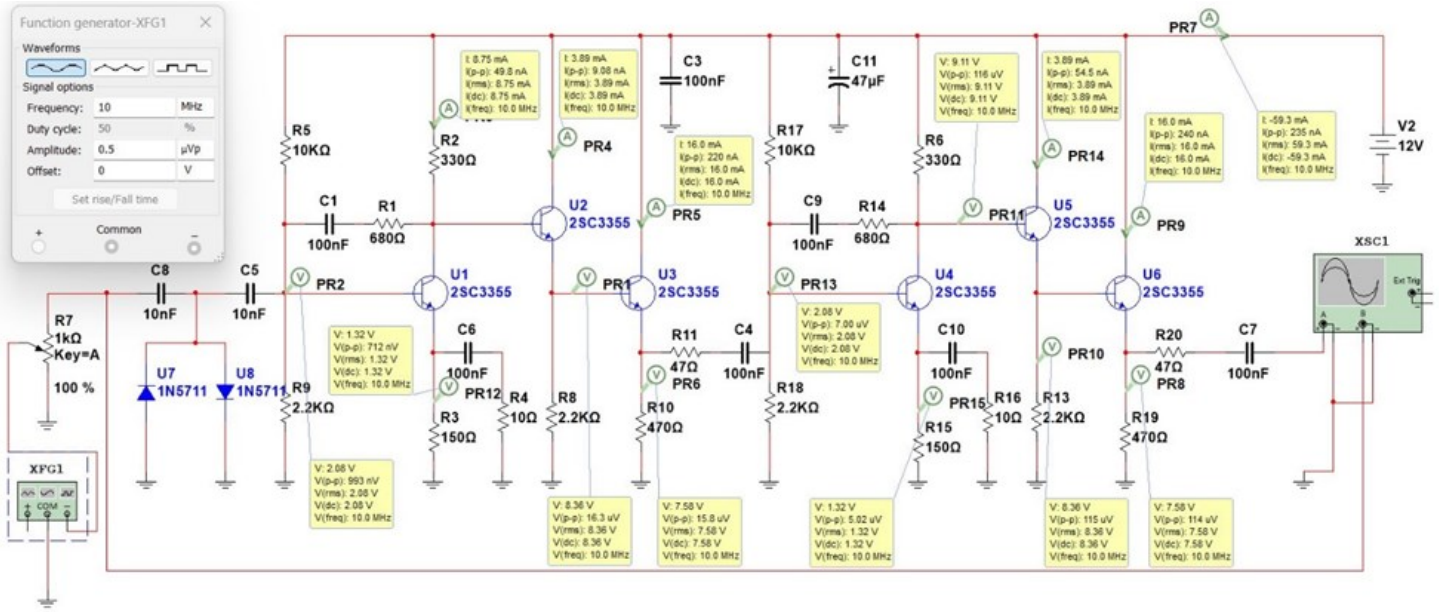
Wideband antenna preamplifier with six NPN transistors



This antenna preamplifier assures over 45 times amplification for frequencies under 30 MHz. It was also useful at 161.650 MHz. where I tried it with a local weather station, but the amplification there tends to be just less than 10 times. It is supplied power from 12 V, it consumes 60 mA and it was placed in a cheap metallic enclosure bought from Dollarama. I use it for an SDR receiver, a RSP1 Chinese clone.

The schematic was inspired by the article "A Termination Insensitive Amplifier for Bidirectional Transceivers" by Wes Hayward W7ZOI & Bob Kopski K3NHI. They used 3 NPN 2N3904 transistors. I used 6 NPN 2SC3355 transistors. Their article, with a lot of theory about bi-directional





amplifiers (not related to my project) can be downloaded from:

http://w7zoi.net/bidirectional_matched_amplifier.pdf

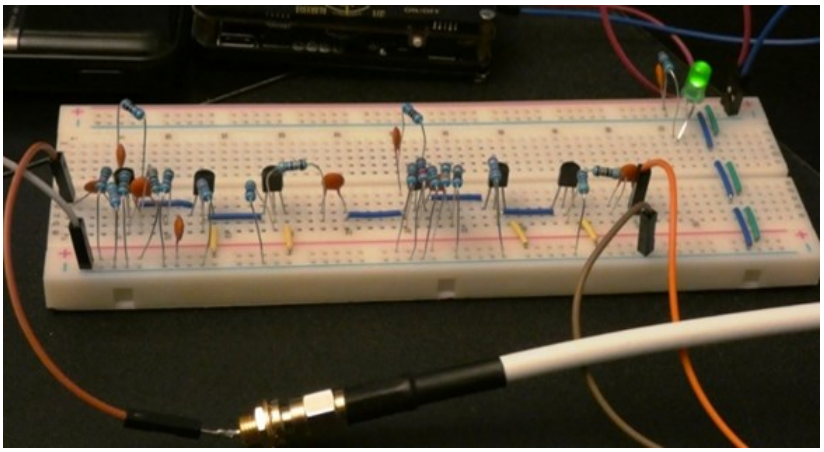
There is also a video about building the amplifier as presented in the above article, a video made by M0NTV, about home brewing:

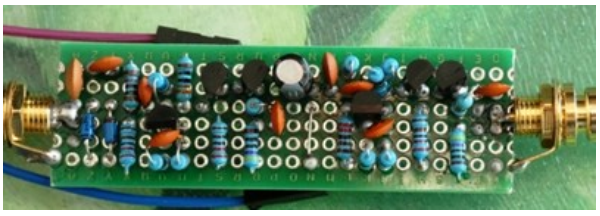
https://www.youtube.com/watch?v=CpQK0W7TY5g

I started by drawing a schematic in Multisim 14.3. In the end, after several iterations, the schematic is shown on the previous page. The schematic is easily reproduced by a reader. At the top of this page is the schematic with some measurement's points. The software can simulate the schematic. Therefore you can see a virtual signal generator and a virtual oscilloscope in the graphic above.

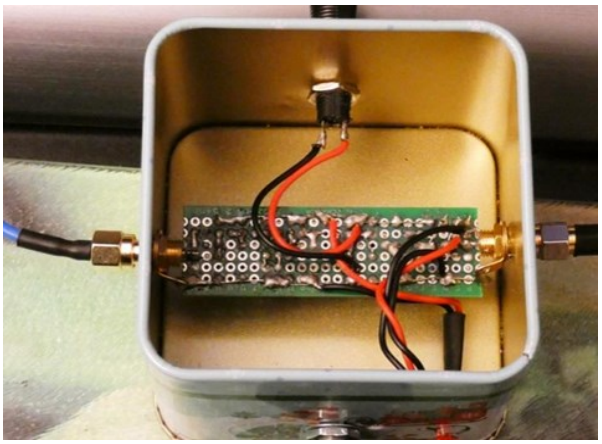
After achieving stable operation in the simulation, I went on to build on the breadboard shown on the left.

I already had a metallic case in mind that I bought from Dollarama for such radio projects. I intended to have the input connector soldered on one side of a board, and the output connector at the opposite side. The board would simply stay in the box because of the two connectors being screwed through the box:





I temporarily soldered the connectors on the board to verify the functioning of the board. I applied maximum signal, without the variable attenuator made by using a 1 Kohm potentiometer at the input. Everything was fine, so I started to drill the metallic case for the input, output, power supply, LED and potentiometer. I de-soldered the IN/OUT connectors and soldered them back on the board inside the metallic case *[right]*.



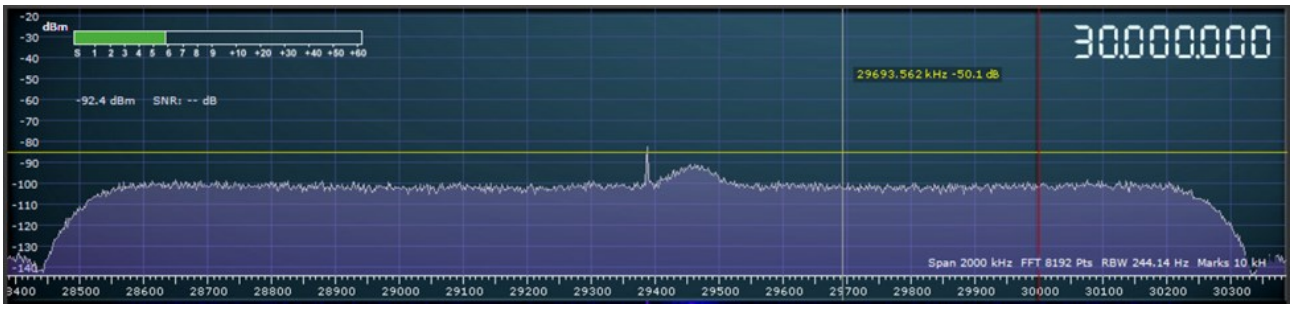
Measurements were done with the software SDR Uno and with an RSP1 Chinese clone. There are many other Software Defined Radio programs that might work with your SDR dongle/receiver.

The amplifier also works fine with any receiver, not only with a SDR.

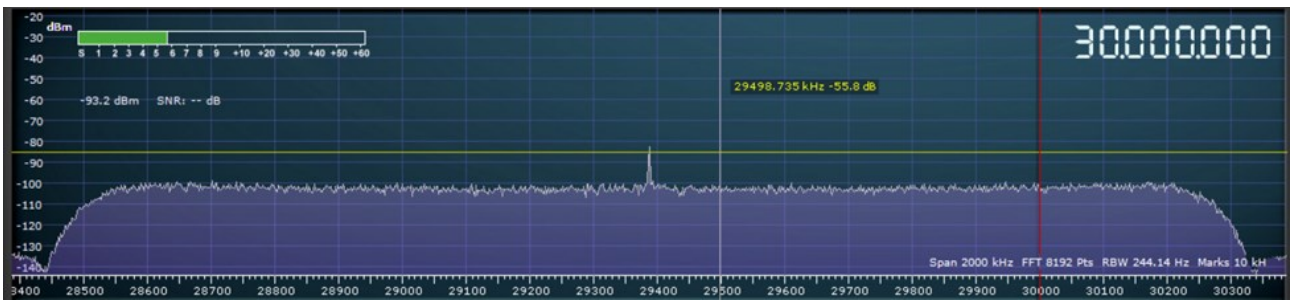
When I started this wideband antenna preamplifier, I specifically had in my mind SDR receivers. Their advantage is that one can see on screen in the waterfall all signals from a wide range of frequencies, 10 MHz in my case, when using a RSP1 clone and 2 MHz with an RTL dongle.

Please keep in mind that all measurements done with SDR software are for comparison only. The following are screenshots:

Noise floor with preamplifier at 30 MHz, with the antenna connector shortcut (-92.4 dB):

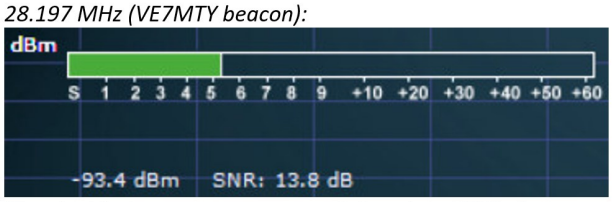


Noise floor with RSP1 clone only at 30 MHz, with the antenna connector shortcut (-93.2 dB):



Because of the amplifier the noise increased by 0.9 dB. One can count on 33 dB amplification (almost 45 times) in the 10-meter band and more (around 38.3 dB = 82 times) on the 1.8 MHz band.

Signal with the antenna connected directly at RSP1 clone, at 28.197 MHz (VE7MTY beacon):

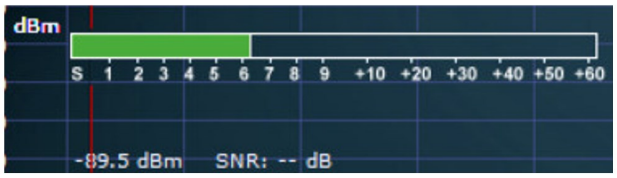


Signal with preamplifier at 28.197 MHz (VE7MTY beacon):

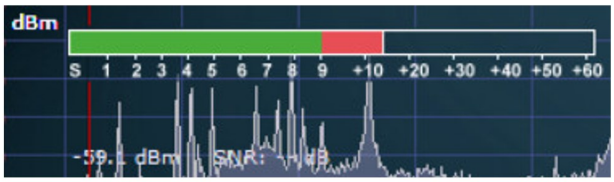
Signal with the antenna connected directly at RSP1 clone, at 1410 KHz:

Signal with preamplifier at 1410 KHz:

Signal with the antenna connected directly at RSP1 clone, at 600 KHz:



Signal with preamplifier at 600 KHz:



One can count on 33 dB amplification (almost 45 times) in the 10-meter band and more (around 38.3 dB = 82 times) on the 1.8 MHz band.

~ Daniel VE7LCG

Radioteletype (RTTY) is a telecommunications system consisting of two or more terminals in different locations, connected by radio rather than a wired link. Radioteletype evolved from earlier landline teleprinter operations that began in the mid-1800s.

Commercially the system is now seldom used however, in Amateur Radio it remains a reliable means of exchanging text based messages.

We will participate in the RTTY contest on February 11th at the OTC. Come give it a try.

...more from

A tuned shortwave antenna preamplifier

I just finished an antenna preamplifier with two BF998 MOS-FET transistors, both of them amplifying, and I wanted to obtain even more amplification, in a smaller box. The target receiver I used was an RSP1 Chinese clone. I wanted to use the cheap high performance 2SC3355 NPN transistors which have a noise figure of 1.1 dB at 1 GHz. The gain bandwidth product is 6.5 GHz. The schematic is on the next page and the final box is shown top right.

I used only one tuned inductor at the input, connected with the antenna by another coupled inductor. Everything was built on double sided perforated board. When a device is soldered on a double sided board the solder goes through the hole from one side to another and the soldered component would be very difficult to ever remove.

Because I wanted to experiment on various frequencies, from less than 100 KHz to above 30 MHz I put the inductors on a support board and inserted them in a 14-pin integrated circuit socket. I made 5 such inductors boards. I used molded inductors for lower frequencies.

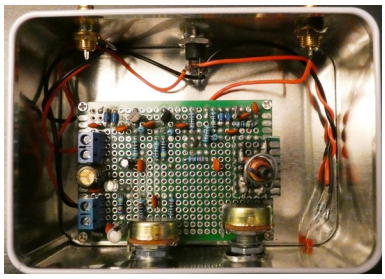
The two coils can be pushed closer or further away to obtain good selectivity. Experiment for the best results.

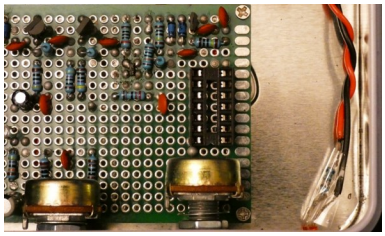
For a varicap diode SV149 with resulting capacity on the project's board between 55 pF and 547 pF:

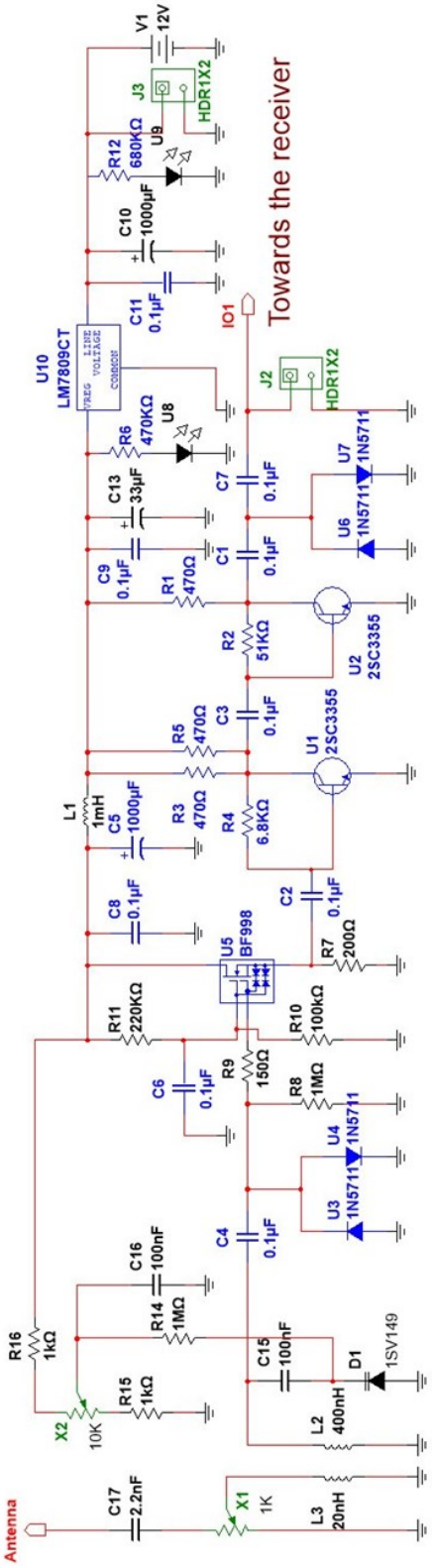
Tuned inductor	Antenna's side inductor	F min KHz	F max KHz
10 mH	4.7 mH	70	214
150 uH	47 uH	566	1752
22 uH	10 uH	1478	4575
4 uH	1 uH	3466	10730
220 nH	41 nH	14780	45753

Comments on the schematic

The schematic has a repeater with BF998. This adapts the high impedance required for the tuned inductor with the low impedance of the next stage, a common emitter NPN transistor. The optimum resistor for maximum amplification is 200 Ohms at the source of the dual gate MOS-FET BF998. This transistor requires under 12 V power supply. I installed a 9 V 3-pin stabilizer. The total consumed current is around 47 mA. I put a LED on the case to show me there is 12 V entering the case. I put another LED on the board for confirming that there is voltage after the stabilizer. My LEDs light at very low current, in the range of







tenths of microamps, so I could use high values resistors in series with the LEDs.

There are fast protection diodes at the input of the preamplifier, but also at the output of the amplifier. In the hundreds of KHz bands the preamplifier ‘s amplification is more than 500 times the input voltage, so a receiver can easily be damaged without those limiting diodes at the output.

I did not even think about supplying power to the Chinese clone of RSP1 before opening the case and soldering protection diodes at all 5 inputs. So, there are protection diodes everywhere.

The 1 Kohm potentiometer from the antenna serves as attenuator. I indeed use it in medium waves. It must have a linear characteristic. There is a 10 Kohm potentiometer, also with a linear characteristic, for varying the voltage applied to a varicap diode SV149. In my project, after everything was put on the board, I could vary the capacitance between 55 pF and 547 pF. In this way I avoided using a big mechanical air variable capacitor.

The schematic is stable due to low impedance in the amplification chain, with the 2SC3355 transistors. The first one has two 470 Ohm resistors at the collector. This is because of the current passing in the collector of the first transistor, which can be at the limit for the small power resistors I used. I placed the two resistors in parallel and I used the marking on them to put them one in one direction and the other upside-down. The resistors are also inductors, and I wanted to somehow limit the radiation. It did not seem necessary. My preamplifier did not oscillate in or outside the metallic case.

This preamplifier made me play with SDR receivers again. In the past the SDR receivers I had were no fun when catching stations on false frequencies. The tuned input of the preamplifier cuts almost all those ghosts. There is of course, a loss of bandwidth with the SDR receiver.

Measurements

I used a Chinese RSP1 clone as receiver and a modified CB stick antenna, made longer to resonate at 29 MHz. The clone was opened, and protection diodes were inserted at every single input.

All measurements were done with this antenna, which is very poor but gives a clear comparison at several frequencies between the signals in the SDR Uno software, with the preamplifier and without it. I also included the signal measurements from the SDR Uno at that frequency

without the antenna, to see the comparative noise at those frequencies with and without the preamplifier. Since the measurements given by the SDR Uno software are only in dBM, I converted to microVolts, as well, and added the numbers under the screenshots. When I measured only the noise, I placed a short at the RSP1 input and at the preamplifier input respectively.

I adjusted the distance between the two coils for good selectivity while still maintaining a strong signal. Rotating the potentiometer for the varicap voltage, one can see a wave moving left and right in the SDR Uno software waterfall. The peak wave is at the tuning frequency. I used the largest knob for the potentiometer, the biggest the case allowed me.

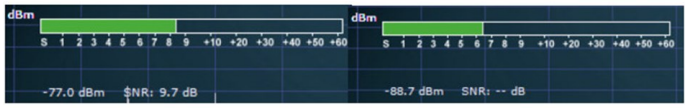
This preamplifier shines at lower frequencies, where the amplification factor is in the range of hundreds. On the 10 meter band it still offers three times amplification of the signal.

Note: The SDR Uno is not intended as a precision measurement tool… to the best of my knowledge. But it is available for free and gives a comparative indication of reception with and without the preamplifier. Any reader can try to build the schematic and replicate what I did.

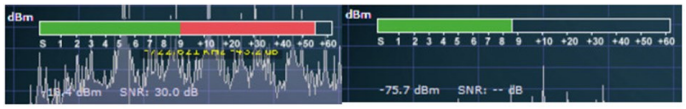
~ Daniel VE7LCG

672 KHz

RSP1 only signal | RSP1 only noise level



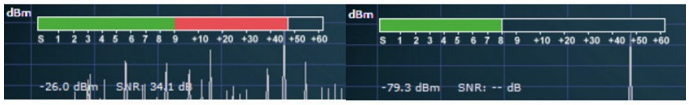
31.7 uV - 8.2 uV = **23.5 uV**



27 mV (overload) - 36.5 uV = **26963.5 uV (overload)**

1200 KHz

39.5 - 7.6 uV **= 31.9 uV**



11200 uV - 24.2 uV **= 11175.8 uV**

(350.33 X amplification)

4 MHz

RSP1 only signal | RSP1 only noise level

15.3 uV - 0.67 uV = **14.63 uV**

1028 uV - 1.84 uV = **1026.16 uV**

(70.14 X amplification)

30 MHz

RSP1 only signal | RSP1 only noise level

1.63 uV - 1.16 uV = **0.47 uV**

2.90 uV - 1.45 uV = **1.45 uV**

...more from

Measurement of a RH-770 antenna with a NanoVNA

In the September 2022 edition of DARU magazine and The SARC Communicator magazine *[November—December page 44]* I saw measurements of antennas for handhelds. The December edition of Radio ZS talked about Chinese handhelds and their antenna. I was surprised no article talked about real antennas for handhelds (LOL), which are the RH-770 and AL-800. Yes, they are big. This is what you want for an antenna, isn't it?

RH-770 and AL-800 are practically the same antenna. I prefer RH-770 which did not break on me, while two AL-800 survived only several days.

I can confirm that this antenna also works on 220 MHz (somehow, almost reasonably), so I will post screenshots of the measurements here made with a NanoVNA v2 SAA2 for 144 MHz, 220 MHz and 430 MHz bands. Before doing any measurement, I calibrated the NanoVNA in the NanoVNA Saver 0.5.3 software. I needed the tethering with the computer to post nice screenshots here. For the 220 MHz band I completely closed in the upper section, so the antenna was 46.5 cm as in the image at the left.

SMA Female

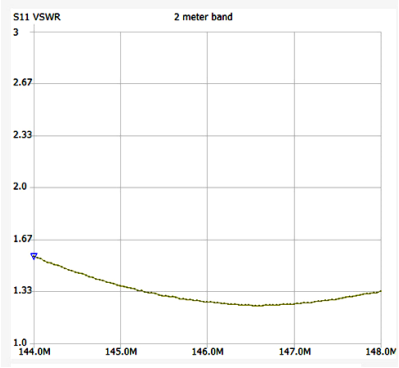
SMA Male

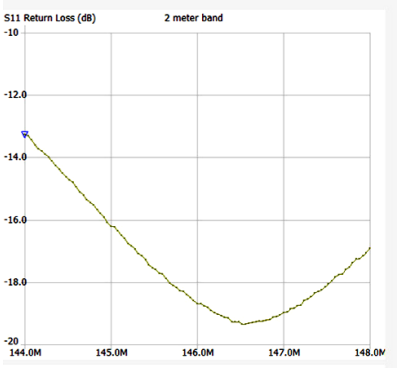
BNC

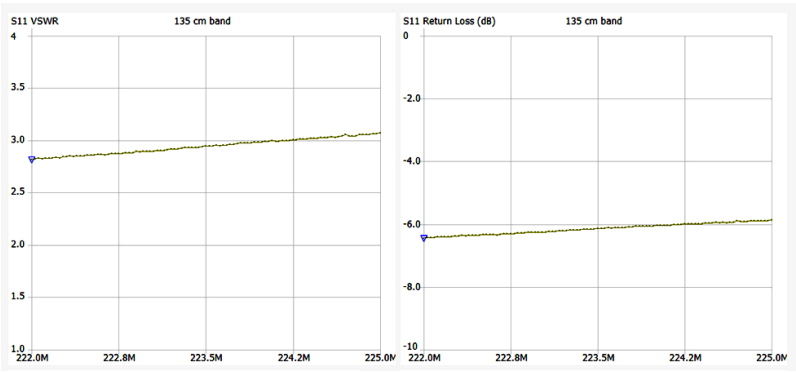
I used the classic simple calibration method and the measurements methods, as for example described in these 4 and 6 minute videos on YouTube:

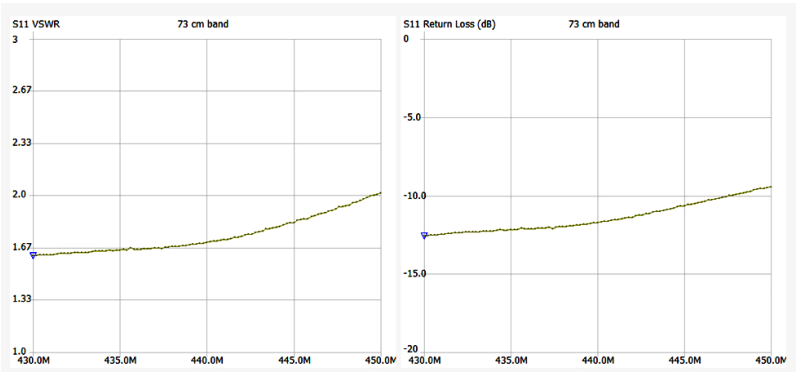
https://www.youtube.com/watch?v=fld8KtRd4bw

https://www.youtube.com/watch?v=xa6dqx9udcg









Specifications:

Frequency: 144/430MHz & Wide Band
Gain (MAX): 3.0db (144MHz) 5.5dB(430MHz)
Max Power: 20W
Color: Silver
Inpedance: 50 OHM
V.S.W.R.: LESS1.5
Length: 21.5cm (92.1cm full stretch)
Connector: SMA-Female/Male/BNC
Weight: 90g

In the above measurements I was mostly interested in SWR and whether the antenna can indeed be tuned for the radio amateur bands (144 – 220 – 430 MHz).

Longer antennas like the RH-770 and AL-800 improve handhelds a lot. They are not as comfortable as the original ones that come with the radio when buying the handhelds, but they are worth the improvement.

~ *Daniel VE7LCG*

Club News, Amateur Radio Courses, Nets and Articles...

Amateur Radio Courses: https://www.rac.ca/amateur-radio-courses/

Radio Amateurs of Canada is pleased to continue to promote Amateur Radio Courses - including Basic, Advanced and CW which are being organized by clubs so please send them to us. For example, the Surrey Amateur Radio Communications (SARC) in partnership with the Surrey Emergency Program Amateur Radio (SEPAR), has an online class starting on September 19th.

...more from

The Endless Problem of the Soldering Tool

A short summary of this article: any soldering tool is only as good as its soldering tip. There are money to spend on the replaceable tips, and the cost of the soldering tip is equally financially important as the cost of the tool itself.

Note: at the end of 2022 I noticed big variation in prices, both up and down. Please consider the prices provided in this article as just a ballpark.

I used to do a lot of soldering and unsoldering before moving mostly to breadboards to make and test my projects. Even now, there are modules I prepare for breadboarding, and radio frequency projects that are better to solder in the air if not on some dedicated board, because breadboards have parasitic capacitance between their lines (6 pF between adjacent lines).

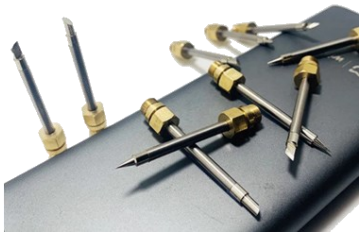
Soldering the male pin headers for an Arduino board means 30 soldering points, plus 6 for the header on top of it.

A comfortable family of soldering tools are the battery cordless, or USB power supplied tools. I had a bunch of them *[shown lower left]*.

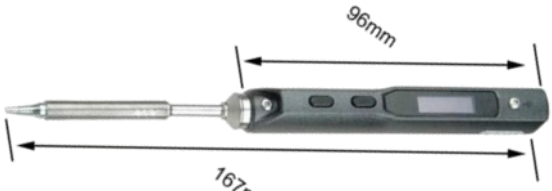
They are under C$10, shipping and taxes included. After throwing the tool itself in the garbage, one can still have the USB cable terminated with an audio connector, which can be put under your pillow… to remember the soldering tool. I was never able to solder all 30 soldering points of an Arduino Nano with such a toy. It started great. Very comfortable. Easy soldering. And it became more and more difficult to heat and make the solder melt. It stops after about 20 solder joints. The cheaper tip I found for this soldering tool costs C$3.40 (shipping and taxes included). It can be ordered now, and it would take at least several weeks to arrive.

There are more fancy models, which cost more. For example, the one shown here, for C$15.

It looks great, but before jumping to buy it, I looked how much this 510-interface soldering tip would cost me…at least C$7 each.



Some other soldering irons have microcontrollers in them, and people spend time with all kinds of firmware. Yes, for a soldering iron, which costs at least C$68, (shipping and taxes included). As you can see from the picture below, the TS100 hand position is not close to the soldering tip, because it is very long. The hand is at least at 71 mm above the solder (2 ¾ inches, but



actually 3 inches because of a screw). That is not usable for me. The tip is around C$10 each (shipping and taxes included).

So, I decided to attack the soldering problem another way. Instead of looking for a soldering gun, look for cheap soldering tips, and only after you find on which brand of soldering irons those tips can eventually fit. I found some for less than C$.60 for wire and under C$.90 for the 900 M-T tips (shipping and taxes included) *[shown lower right]*.

I had good experience in my childhood with soldering irons. They are big, but if they are under 1 Kg (2.2 pounds) they are comfortable to use. It seems no one uses them anymore nowadays. I still do. I bought two models online, just because they are cheap.

Those cheap foreign models are under C$35 each, and they work on 220 V, not 110 V, so they need an adapter. The grey one has some cooling air vents. The wire tip is secured in a kind of flower with 4 petals, which easily break. You can see the detail on mine, with one already broken. The orange model has screws for directly fixing the soldering tip. The air flow is very difficult in this model, because of just tiny openings in the plastic case. The case is plastic and easily melts because of the heat. The first thing to do, if you decide to buy such a soldering gun, is to verify that it works, and immediately afterwards to open it to replace the light bulb with a LED and a resistor in series (about 330 Ohm would do, for a 5 mm red LED). The light bulb would burn-out anyhow after several soldering joints.

It is comfortable to have such a soldering gun in hand because it is around 1 pound (about 300 grams – under 1 kilo). The more serious soldering guns can be bought from the automotive stores. I tried several from the Weller brand. They are good, they do not overheat immediately, they work from 110 V electric plug, but they are heavy. They are so heavy that my hand started to shake after one single solder joint. I cannot use them.

An assortment of tips to choose from

So, for electronics projects there are the cheap foreign models, which severely overheat after two solder joints. I bought some small fans; I will modify those soldering guns for forced air cooling, and I will write the result in another article. I really do not feel like abandoning these soldering guns, since I've had such good experience with them in my childhood, when they were built at much better quality.

The other cheap tips, the 900 M-T tips are hollow cylinders which fit as a glove on top of a heating element. They fit a large variety of soldering tools, from cheap independent irons to complex soldering stations.

The price varies between C$7 and C$14, for the model with a digital display for temperature. The hand grip is important, again because of the distance between the hand and the actual soldering point. I like the last two models, with potentiometers for adjusting the temperature and with buttons and LCD, respectively, because of the rubber grip added to the iron. Otherwise, they use the same tips, around a heating element with 40 – 80 Watts of power. I found this kind of iron, the cheapest kind from the soldering irons/guns, to be the most reliable one.

I decided to spend some money on a more serious soldering station, and I got one for C$43.28 (shipping and taxes included). My JCD 8898 2-in-1 Soldering Station set:

It has a temperature stabilized iron, 80 Watts, temperature range: 180°C-500°C (356 F – 932 F) and temperature Stability: ±1°C (1 F). The hot air gun has output power: 800W, temperature range: 100° C~480°C (212 F – 896 F), temperature stability:±2▫ (2 F) and air flow: 150L/ minute (max).

It has a main body, with 2 side switches, one for the soldering iron and one for the hot air gun, and 5 other buttons for setting the temperatures of the two tools, and the speed of the air flow.

The main problem with the soldering iron is the same as with the iron costing only C$7 – 8. The soldering tip is hot only if it stays well connected to the resistive heater. This depends on how well a screw cap on the main body of the soldering iron is tightened.

Somehow soldering was more stable, with better temperature stabilization, constant from one solder application to the other, using this iron. The tips are exactly the same. With the hot air gun I was able to unsolder an EC11 digital encoder module from a double sided perforated

prototyping board. It is an accomplishment, because it has 5 pins *[shown top right]*, and because up to now everything I soldered on a double-sided prototyping board, having solder melted up, down and on the hole's channel, was there forever, without any hope of recovering that component.

There are many such soldering stations that can be purchased online, made by various manufacturers, with more or less features, and some differ from mine only by the position of the buttons. I just bought the above mostly based on the price I could afford. Two 8 – 9 minute video reviews of the JJCD 8898 2-in-1 Soldering Station set:

https://www.youtube.com/watch?v=wcuwOnMgnHA

https://www.youtube.com/watch?v=4TyHfmt4lTw

~ *Daniel VE7LCG*

Modify soldering guns for forced air cooling

~ Daniel Romila VE7LCG

This article follows up on the previous one, with Daniel's modifications to make the soldering guns more comfortable to use.

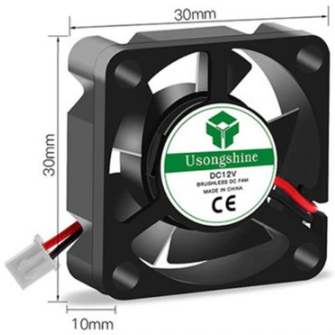
Many of us still want to use soldering guns and the market offers us cheap such tools and soldering tips. Actually, they are the cheapest replaceable soldering tips there can be.

The quality of the available cheap soldering guns is not good. Also, they work from 220V, which is not the standard for North America, and they require a powerful 100 – 150 Watt adapter. When I have to solder a lot, I use my soldering station. But if I just need to solder 1 – 6 solder joints I immediately grab one of my soldering guns.

This is what can be found on the Internet, for under C$35, shipping and taxes included.

The gray one has more cooling vents than the orange model. The tip is mounted with 2 screws for the orange model, and the gray model has what looks like a flower with 4 petals into which the soldering tip is inserted,

I measured the weight of the soldering guns I have.



and screw caps on top of the flower, keeping everything tight. Both soldering guns are low quality. They overheat and the gray model easily breaks the soldering tip if caught on parts. So, you can ask why I am wasting my time with these tools?

As already mentioned, I have those soldering guns in addition to a soldering station, hot air and other smaller soldering tools. I am loaded. It is just fun to play with and experiment. There are way better-quality soldering guns one can buy made by Weller and MotoMaster, with power between 60 Watts and hundreds of Watts, and even nicer models with two steps of power, usually 100 and 150 Watts. But those models are heavy, more than 1 kilo, and I simply cannot keep them in hand to solder.

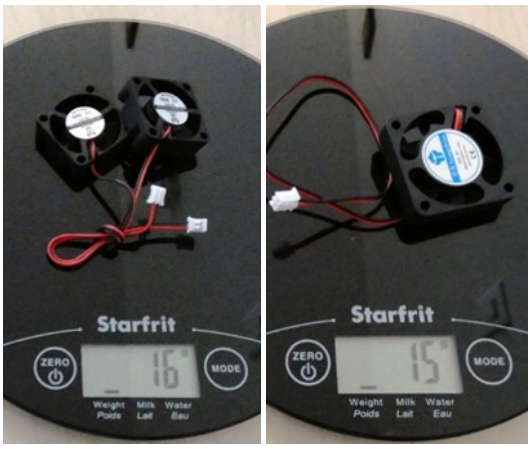
The whole point of using a soldering gun is to use another hand grip in addition to the pen grip I have with the iron from my soldering station and with the cordless ones.

I cannot stress enough how important the weight of a soldering gun is when soldering electronic components and non-automotive cables.

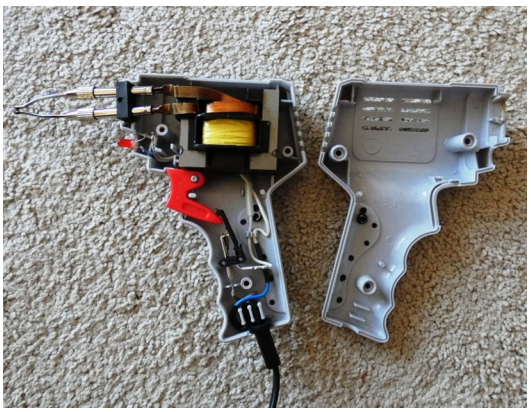
The vents they have in the plastic case are not enough for cooling. They can complete just a few solder joints before they no longer melt the solder, and the case is hot (from the transformer inside). The solution is to use some fans which do not add too much weight, and which are easy to power. Such small fans can be found on the Internet, and I decided the models that I needed are one 4010 fan for the gray one and two 3010 type fans for the orange one.

Both models are available for 5V, 12V and 24V. I bought the 5V models, to be able to eventually over voltage them for faster air flow. Afterwards I found that 5V – 6V are enough.

I was curious to find out their weight since weight is so important for keeping the soldering tool in hand. Please keep in mind that in the end eventually there will also be a small switching power supply board to be placed in the handle of the soldering guns. A few grams will disappear because of drilling ventilation holes in the case.



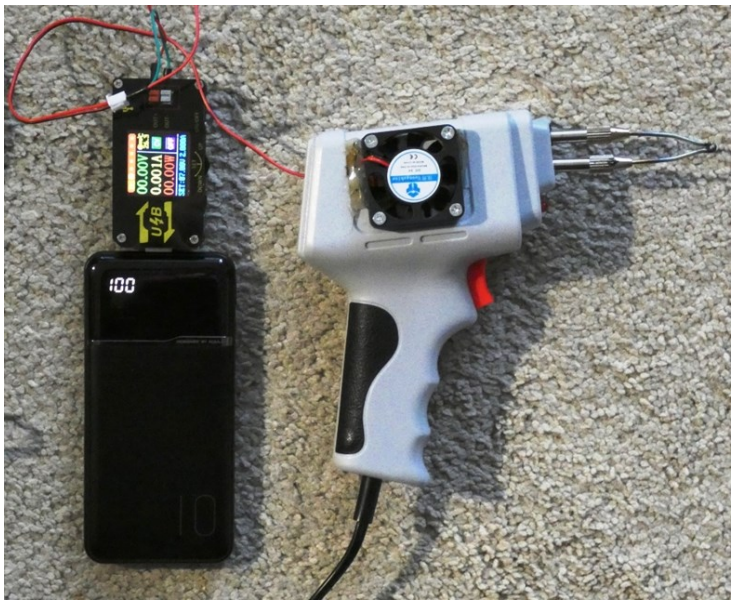
It seems everything is fine, from the weight point of view. This is how the gray soldering gun looked inside, after it had the light bulb and the bulb socket replaced with a LED and resistor (330 Ohm) in series:



Pretty cheap and low quality. If you want to repeat my experiment – our hobby is about experimenting, even when it does not make much sense to experiment, like in the case of this article LOL – I recommend the orange soldering gun. You can even skip to the part where I modified that orange soldering gun, which was a big success.

For efficient air cooling it is important that the fan sucks or pushes the air into the transformer, and blocks any openings accidentally created in the case, which would result in a useless path to air flow. What I did was to use screws to first attach the 4010 fan on half of the case and use plastic glue around to seal it. For the first phase I recommend to just seal it with plastic glue, no matter how it looks, verify everything. Then open the case again afterwards for final esthetic gluing (re-gluing) when it is clear that everything is OK, and it is ready to become a finished product. As you see in the picture below, the sealing does not look nice initially; it is a temporary appearance. When finishing, the plastic glue can be heated to melt it on the whole surface, and it will make a nice glass like layer. This plastic glue is forgiving and can be reheated several times to attempt to make it like glass again if the first attempt fails. But in my experience this glue is so friendly that it never gave me any trouble and looked like a professional put it there. So, for the moment I just sealed it and left the esthetics part for the next stage.

I had a variable power adapter and I started to solder, to see if my experiment had any chance to succeed. I found that the transformer does not overheat anymore (as felt before on the handle of the case, even at the hand level). Between soldering, the gun now cools itself, and 5-6 volts are enough for efficient cooling. The next step is to disassemble the soldering gun again, make the plastic sealing look nicer and add a small switching power supply board inside



the handle add providing under 300 mA. There are plenty on-line for C$3 – 4.

The orange soldering gun case allows for the mounting of two 3010 fans, one next to the other, and it looks nicer on the case. The fans themselves can hide the ugly holes made for ventilation, and with a little luck no sealing glue is necessary at all. The screws for the fan can be put in the existing air vents, so the case will look much nicer than in the case for the gray soldering gun:

The consumption for the two 3010 fans, at 5V is 230 mA. The orange case is more generous with space, and it will be easy to install a small switching power supply board inside the handle for the fans. The result was so good that I started to solder just to test, and I remembered that I had some connectors to solder that I had abandoned for a while, some transistors to take out from an old board, a piezo filter and I finally stopped, to finish writing this article.

Because it is under 500 grams the whole soldering gun with the fans is comfortable to handle.

I presented an experiment worth trying. A soldering station cannot be replaced by this soldering gun solution, although I had many years in my childhood soldering and I soldered only with this kind of tool.

~ *Daniel VE7LCG*

The Communicator

Solder Splatter

John Brodie VA7XB

Traditional lead/tin v lead-free solder - The controversy is not yet over

Tin-lead Solder

Anyone who has had a basic course in metallurgy or materials science will be familiar with phase diagrams (aka "Pourbais" diagrams). Phase diagrams traditionally were developed experimentally and, for binary or 2-component systems they can also be created from first principles using thermodynamic properties of their component metals.

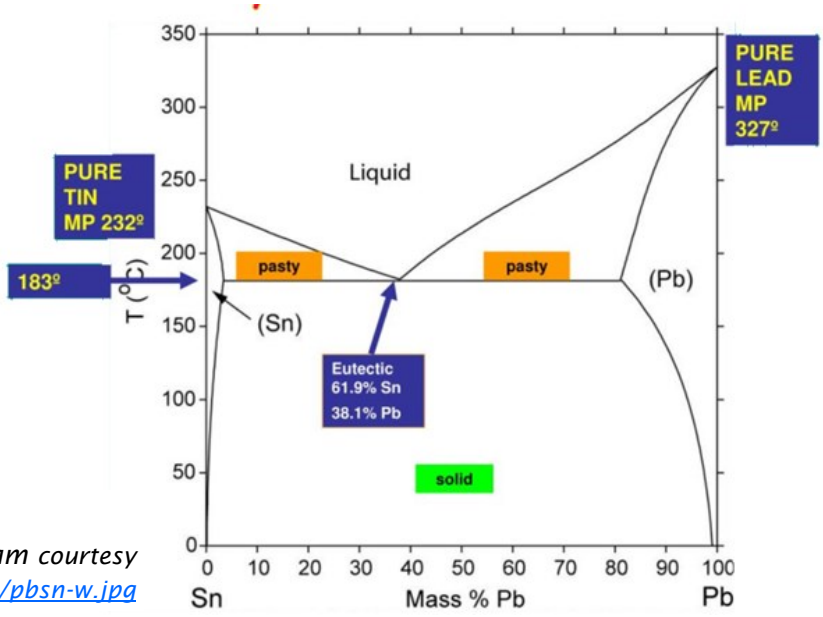
Below is a phase diagram for tin (Sn) and lead (Pb) showing the various phases present at various temperatures and compositions. The left side is pure tin and the right side is pure lead. Notice that the presence of Pb lowers the melting point of Sn, and vice versa.

Although the common solder that we have used for many hundreds of years is known as 60/40 solder or sometimes 63/37, the ideal composition without impurities is 61.9% Sn and 38.1% Pb. Small amounts of various metals, notably antimony and silver, are sometimes added to increase its strength.

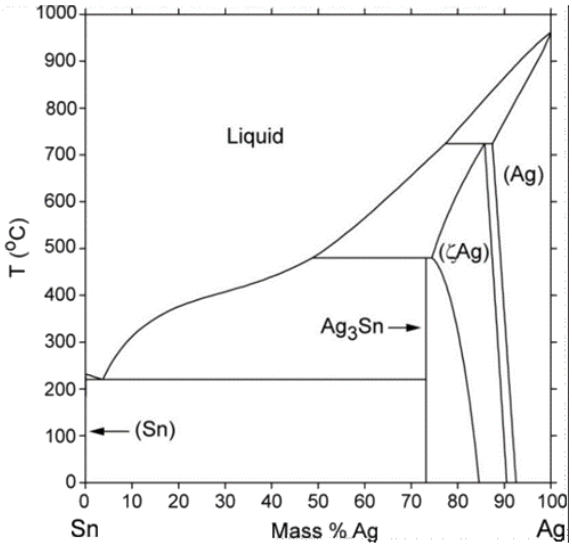
This specific alloy, called the "eutectic" composition, is characterized as follows:

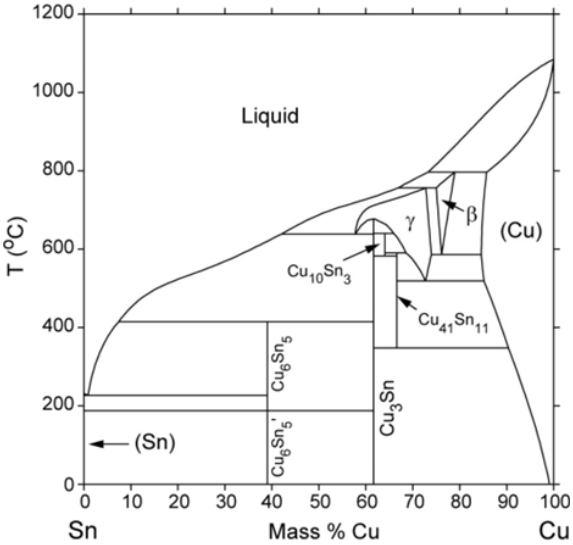
1. 183 C or 361 F is the lowest melting point alloy of the two metals.
2. Upon cooling, molten solder solidifies at a distinct temperature, passing from a liquid to a solid without transitioning through a "mushy" phase containing both solid and liquid phases.

In recent years, there has been a move away from tin-lead solder for several environmental reasons:



Solder theory: Tin-lead phase diagram courtesy http://www.metallurgy.nist.gov/phase/solder/pbsn-w.jpg





1. the lead content may pose a health hazard if the fumes are breathed to excess as both lead and lead oxide form volatile vapours when heated.
2. Lead in wastes may also be released to groundwater when landfilled, or released to the air when burned.
3. Leaching of lead into water occurs under some conditions, which has led to its use being prohibited virtually everywhere for potable water systems.

Therefore most electronics manufacturers have moved to lead-free solder, either by choice or by law as in the case of the European Union. Although the use of traditional Sn-Pb solder is prohibited for most applications in the EU and many other countries it is, apparently, still widely available on the market and remains the product of choice for hobbyists.

Lead-Free Solder

Lead-free solder is tin-based and may be marketed with various compositions but virtually all melt at a higher temperature, and many lead-free alloys do not have a distinct eutectic.

Common lead-free solder alloys are a) 98% Sn/2% Ag and b) 97% Sn/2% Ag/1% Cu (known as SAC). Other variants are also available containing indium, antimony, bismuth or zinc .

Increasing the silver content to about 4% is claimed to create a true eutectic and improve the quality and thermal reliability of the solder joint. Examples of higher silver alloys are SAC387 and SAC405. However, this raises the cost of the product which has driven the industry to favour the low silver alloys such as SAC (ref. 1).

The phase diagrams for both Sn/Ag and Sn/Cu show that these alloys have a barely detectable eutectic and thus have a melting point of around 217 C which is very close to that of pure tin.

Pros

Aside from the environmental benefits, which represent the primary driving force for its use, lead-free solder is reputed to be better in in some respects for through-hole electronic circuit boards because it doesn't spread when reflowing, resulting in better bonds. However, not all users agree that it is superior to conventional Sn/Pb solder and its advantages are still disputed even after many years since its introduction.

Cons

Compared with tin/lead solder, lead-free solder does require a higher temperature (typically 217 C) to melt (or solidify) and that can result in burning of the flux or lifting of the copper pads before the solder flows. The higher temperature during soldering may also melt adjacent plastic or damage electronic components, especially if they are not adequately protected by a heat-sink.

Lead-free solder has a higher surface tension and thus does not "wet" the surfaces so readily.

The metals used for lead-free solder tend to oxidize faster than traditional tin-lead solder and therefore old stock may become more difficult to use and/ or soon exceed its shelf life when stored.

Tin/silver/copper solder and other high-Sn alloys are prone to the spontaneous development of 'whiskers' which can cause bridging between circuit paths; this phenomenon has proven most difficult to resolve (ref. 1).

Electromigration is stated in the literature to be another significant problem – the diffusion of metal ions through the solder joint during thermal cycling and by electrochemical action between two joined metal surfaces, one of which is the cathode and the other is the anode – the result being the creation of cavities leading to cracks and failed joints (ref. 1).

Lead-free solder is reputed to be inherently more brittle than tin/lead solder, and thermal expansion of the joined components and the board encourages cracking and fracture of the joint.

Yet, in the vast majority of "hobby" applications, only some of the aforementioned problems will be manifested in practice. Mass production of electronic components is another story, where careful consideration must be given to solder selection, manufacturing and board design in order to avoid failures. Drop your cell phone on the floor and you may wish for less brittle connections!

I have never seen this stated but I know from experience that resoldering of old solder joints with lead-free solder can also be problematic because the alloy mix then becomes contaminated with excessive Sn and no longer behaves as a eutectic upon heating and cooling. A prolonged mushy phase which occurs during solder cooling can lead to what is commonly termed "cold solder joints".

Further Developments in Lead-Free Solder

The addition of nano-particles such as titanium dioxide into Sn-based solder alloys is being used to improve solder joint strength (ref. 2).

A patented variation of lead-free solder is SnCuNiGe, an alloy containing nickel and germanium with a eutectic and melting point of 227 C, reputed to have superior properties compared with the more common SnAgCu. It is marketed as SN100C and Sn100Ni+.

Personally, I much prefer traditional Sn-Pb solder and will continue to use it. Try soldering up coax to PL-259 connectors, where it is already sufficiently challenging to get the braid soundly joined to the shell, and you will probably agree.

~ John VA7XB

Ref. 1. *Lead-Free Solder Alloys: Their Properties And Best Types For Daily Use | Hackaday*

Ref. 2. *Lead-Free Solder - an overview | ScienceDirect Topics*

...more

TECH TOPICS

Getting to the heart of a Baofeng

Dan Maloney

In amateur radio circles, almost no single piece of equipment serves as more of a magnet for controversy than the humble Baofeng handheld transceiver. It's understandable — the radio is a shining example of value engineering, with just enough parts to its job while staying just on the edge of FCC rules. And at about $25 a pop, the radios are cheap enough that experimentation is practically a requirement of ownership.

But stripped down as the Baofeng may be, it holds secrets inside that are even more tempting to play with than the radio itself. And who better than [HB9BLA], a guy who has a suspiciously familiar Swiss accent, to guide us through the RF module at the heart of the Baofeng, the SA818. For about $8 you can get one of these little marvels off AliExpress and have nearly all the important parts of a VHF or UHF radio — an SDR transceiver, a power amp, and all the glue logic to make it work.

In the video below, Andreas puts the SA818 module through its paces with the help of a board that pairs the module with a few accessories, like an audio amp and a low-pass RF filter. With a Raspberry Pi and a Python library to control the module, it's a decent imitation of the functionality of a Baofeng. But that's only the beginning. By adding a USB sound card to the Pi, the setup was able to get into every ham's favorite packet radio system, APRS. There are a ton of other applications for the SA818 modules, some of which [Andreas] mentions at the end of the video. Pocket-sized repeaters, a ridiculously small EchoLink hotspot, and even an AllStar node in an Altoids tin.

Of course, if you want to get in on the fun, you're going to need an amateur radio license. Don't worry, it's easy — we'll help you get there.

The video is at:
https://youtu.be/CIeT4SWneeo

~ *Dan Maloney*
via Hackaday

https://www.k0pir.us/aprs-basics-for-beginners/

Special Event News…

Sander van der Haar, PD9HIX

"The Flood disaster of 1953, the largest natural disaster in Dutch post-war history, occurred in the night of Saturday January 31st to Sunday February 1st. While many in the Dutch province of Zeeland slept, the dikes broke in many places. Due to the combined force of storm, and high tides, the water rose to heights that had never been observed before. Fueled by the heavy storm, the raging water pounded on the dikes. Many were unable to cope with this force of nature, and soon large parts of Zeeland, South Holland and West Brabant were under water."

There is a YouTube video of the disaster at: https://youtu.be/gY6eio6Eqcg

A Dutch family takes refuge on their roof during the North Sea flood of 1953.

Brothers Erwin (PA3EFR), and Sander (PD9HIX) van der Haar will operate a special event station with the call PA70FDN. They are organizing this activity to reflect on the flood disaster that took place 70 years ago during which more than 1,800 people lost their lives.

I found the text *[left]* in an article written about this flood, one of many describing those events long ago. It was radio amateurs who set up communications in the early hours to provide connections from the flooded area, and many lives were indirectly saved as a result.

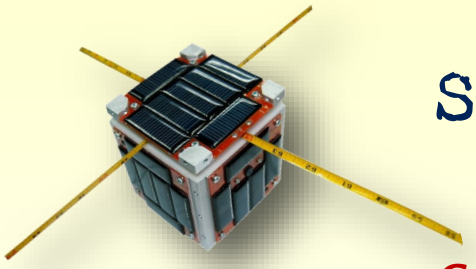
We will operate from the town of Ouddorp, at the centre of the affected area, from the night of January 31st until February 2nd. We will try to be active on all HF bands during this period, and of course you can find us on QRZ.com, where we will also post messages and photos about the ongoing event! We hope to be in touch with many of you!

There will be an extensive report of this event in the next edition of DARU Magazine!

~ Sander PD9HIX

The original article appeared in the magazine of the Dutch Amateur Radio Union.

On January 29th, 1953 there was a north-westerly storm that developed south of Iceland and began to move southwards via Scotland. In the northern section of the North Sea, the wind took a north-north-westerly direction which created a 1,000-kilometre-wide storm field heading straight for the Netherlands.



Satellite News

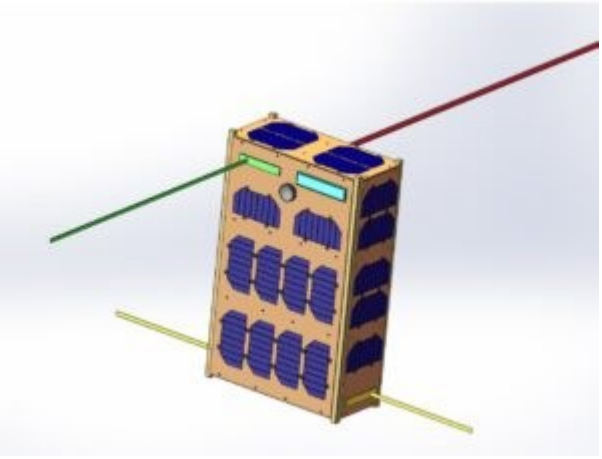
AMSAT

CAS-5A Designated Fengtai-OSCAR 118 (FO-118) and CAMSAT XW-4 (CAS-10)

CAS-5A (FO-118)

On December 9, 2022, the CAS-5A satellite was launched on a Smart Dragon-3 Y1 launch vehicle from the Chinese sea launch platform in the Yellow Sea. The Chinese Amateur Satellite Group (CAMSAT), working closely with local education authorities, designed, built, tested, and manages the CAS-5A satellite. Thirty-one students from ten high schools learned satellite design, manufacturing, and applications through educational courses initiated by CAMSAT and the Fengtai educational institution. The satellite carries V/u and H/u linear transponders, a V/u FM repeater, and CW and GMSK telemetry beacons for amateur radio use.

At the request of CAMSAT and the CAS-5A team, AMSAT hereby designates the satellite as Fengtai-OSCAR 118 (FO-118). We congratulate all the involved teams, thank them for their contribution to the amateur satellite community, and wish them continued success on this and future projects.



The FO-118 User Manual is also now available.

After the satellite completes the in-orbit test and works normally, the space camera photo download will be open to amateur radio enthusiasts all over the world. When the relevant remote control command is received by the satellite, the GMSK telemetry channel will be used to downlink the photo catalog and photo data, and the telemetry data will stop sending at that time. CAS-5A satellite adopts a 6U CubeSat structure with a mass of about 7kg, an on-orbit envelope size of 366x226x100mm (antennas not included) with six sides body-mounted solar panels and a three-axis stabilized attitude control system is used, long-term power consumption is about 10 Watts.

Technical specifications

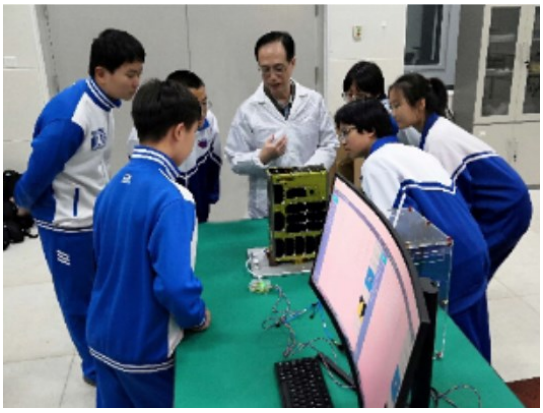
- VHF antenna: 1/4 wavelength whip antenna
- UHF antenna: two 1/4 wavelength whip antenna
- HF antenna: whip antenna
- CW telemetry beacon: Frequency 435.570MHz, RF power: 20dBm, CW rate: 22wpm
- GMSK telemetry: Frequency 435.650MHz, RF power 25dBm, Data rate: 4800/9600bps

- V/U mode linear transponder: Uplink frequency 145.820MHz, Downlink frequency 435.540MHz, RF power 23dBm, Bandwidth 30kHz spectrum inverted
- V/U mode FM transponder: Uplink frequency 145.925MHz, Downlink frequency 435.600MHz, RF power 23dBm, Bandwidth 16kHz
- H/U mode linear transponder: Uplink frequency 21.435MHz, Downlink frequency 435.505MHz, RF power 23dBm, Bandwidth 15kHz, Spectrum normal
- Photo download remote control: Frequency 145.975MHz, RF modulation FM, frequency deviation ±3kHz, Subcarrier: DTMF (dual-tone multi frequency)

CAMSAT XW-4 (CAS-10)

The CAMSAT XW-4 (CAS-10) satellite was launched into the Chinese Space Station on November 12, 2022 aboard China's Tianzhou-5 cargo spacecraft, and was launched by the Long March-7 Y6 launch vehicle from the Wenchang Launch Center in Hainan, China. The XW-4 (CAS-10) satellite was separated from the Chinese space station and entered operational orbit at 01:30 UTC on December 18, 2022. The functions of XW-4 (CAS-10) satellite include UHF CW telemetry beacon, GMSK telemetry data transmission, V/U mode linear transponder, a visible light band space camera.

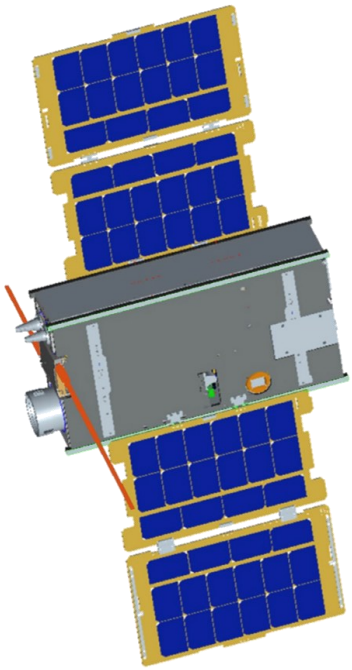
After the satellite completes the in-orbit test and works normally, the space camera photo download will be open to amateur radio enthusiasts all over the world. When the relevant remote control command is received by the satellite, the GMSK telemetry channel will be used to downlink the photo storage information and photo data, and the telemetry data will stop sending at that time. XW-4(CAS-10) satellite adopts a 8U CubeSat structure with a mass of about 12kg, an on-orbit envelope size of 1007x790x475mm with four solar array panels and a three-axis stabilized attitude control system is used, long-term power consumption is about 18.3 Watts



Technical specifications

- VHF antenna: 1/4 wavelength whip antenna
- UHF antenna: 1/4 wavelength whip antenna
- CW telemetry beacon frequency 435.575MHz, RF power 20dBm, CW rate 2wpm
- GMSK telemetry: Frequency 435.725MHz, RF power 23dBm, Data rate 4800bps
- V/U mode linear transponder Uplink frequency 145.870MHz, Downlink frequency 435.180MHz; RF power: 20dBm, Bandwidth 30kHz, Spectrum inverted
- Photo download remote control coming soon…

~



Ham Radio VA3KOT

John Corby

How to Turn a 20+ Year Old Yaesu FT817 into a CW Mean Machine

It was my very first HF radio. A Yaesu FT-817; the original vintage before the ND version was introduced. I was very excited; it was the perfect solution to serve my passion for getting outdoors into the Big Blue Sky Shack to play radio.

I had a lot of success. My outdoor antenna was a MFJ-1979 17ft telescopic whip. I mounted the whip on top of a pole about 12 feet high. Four radials each 17ft long also served as guy lines to keep my home made 20m ground plane antenna vertical. The radio was powered by a 12V, 7AH gel cell that never seemed to run out of charge. The FT-817 was believed to put out its full 5 watts down to a battery voltage of about 10.5 volts and since I didn't like to discharge my gel cell too deeply the radio and battery were a perfect match.

SSB Easy, CW Hard

I started my HF adventures as a SSB operator. I had passed the 5wpm CW test that was required at the time to earn HF privileges in Canada, but 5wpm was nowhere near fast enough to give me the confidence to get on the air as a CW operator. Besides, SSB was easy. And I was getting a lot of QSOs every time I went out to the field. I was happy… but then…

Not So Fast!

It wasn't long before the urge to get on the bands with CW became irresistible, but it took a while to get my speed up to around 14wpm so that I could enjoy QSOs. It took quite a while longer to become proficient at 20+wpm, but that's another story.

It was quickly becoming clear to me that my humble FT-817 couldn't cut the mustard in the world of serious CW operating. I learned that lesson very quickly one Field Day when I tried to operate without the benefit of a CW filter. All I heard was the cacophony of multiple QSOs all happening simultaneously while my receiver was pumping out a bandwidth as wide as the mighty Mississippi.

Yes you can (or should I say could) buy a Collins mechanical filter but that wasn't the only issue I had with the radio. When you

operate CW for any extended time you could be calling CQ hundreds of times and that can become very tiring. And tired fists make keying errors – well mine do anyway. I needed a memory keyer to allow me to send repetitive messages like CQ by simply pressing a button. That's a kinda basic function for most modern radios, but not the Yaesu FT-817.

Adios Old Friend

So, the upshot was, I looked at my FT-817 and told it I needed something better. The front panel of the FT-817 is visually appealing. It's looks like a contented puppy and I was very fond of it. It sat on a shelf in my home shack looking wistfully at me and I looked back wishing there there was some way I could bring it out of retirement. Well, there was a way, and this is how I did it.

A Memory Keyer

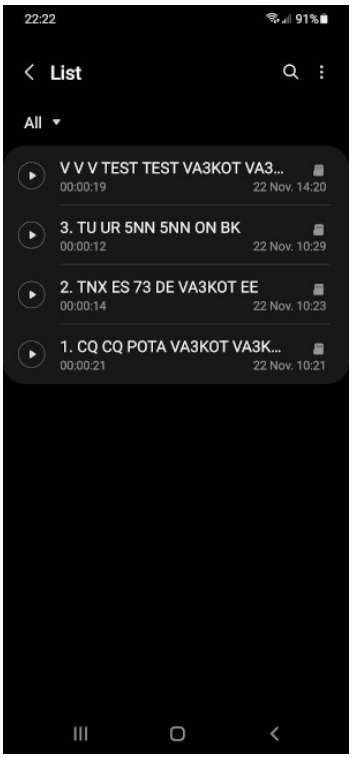
I could have bought a Winkeyer, or I could have used the homebrew version based on K3NG's design. But I had a better idea. I decided to try something completely different. Ham radio is all about experimentation isn't it? So I built a memory keyer with unlimited memories! How many commercial memory keyers can claim that?

The design is very simple. The memory keyer is a cellular mobile phone running a voice recorder app. I keyed a selection of CW messages using another radio and recorded them on the phone. I fed the output from the phone's headphone jack into a "QSK circuit" (a device that converts audio tones into key clicks). The QSK circuit is connected to the FT-817's key jack.

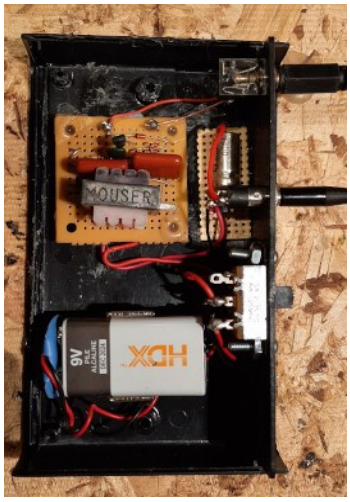
But then I hit a problem. The audio level coming out of a phone's headphone jack is very low. It was insufficient to trigger the transistor (Q2 in the schematic shown below) in the QSK circuit into conducting. The key jack on the FT-817 presents a DC voltage of 5 volts from an open collector circuit in the radio. When the QSK circuit operates it grounds the key connection in the radio to generate a CW signal.

My innovative gizmo needed a boost which was provided by a simple one transistor amplifier powered by a 9 volt battery. The transistor (Q1 in the schematic shown below) is biased on by a 2.2Kohm resistor and converts the weak signal from the phone to a level that allows the QSK circuit to do its job. It worked. The complete circuit shown in the schematic may not be elegant but it passed the smoke test and does what it was designed to do.

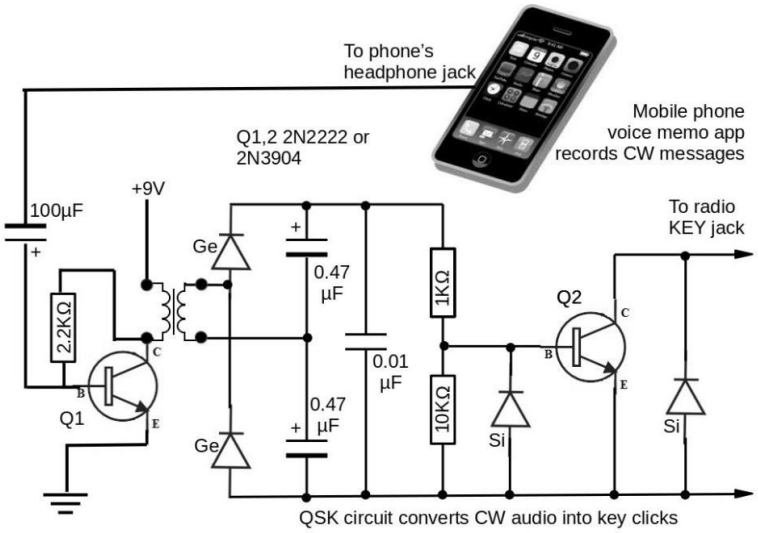
The FT-817's internal keyer must be turned off for this to work. So what happens when the operator needs to send something that isn't in the memories? Simple. The phone keyer is paralleled with a set of paddles. When sending a manually keyed transmission just hit the "keyer" button in the FT-817's menu and use the paddles – or simply use a straight key.



The memory keyer



John VA3KOT resides in Owen Sound, Ontario but is more often found operating CW out in the "Big Blue Sky Shack". He especially enjoys activating parks for the POTA program and blogging about his experiences at HamRadioOutsidetheBox.wordpress.com

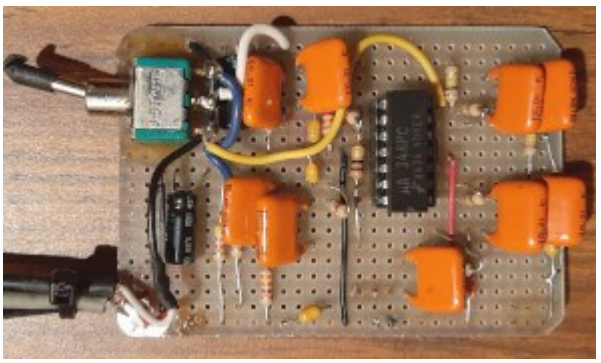


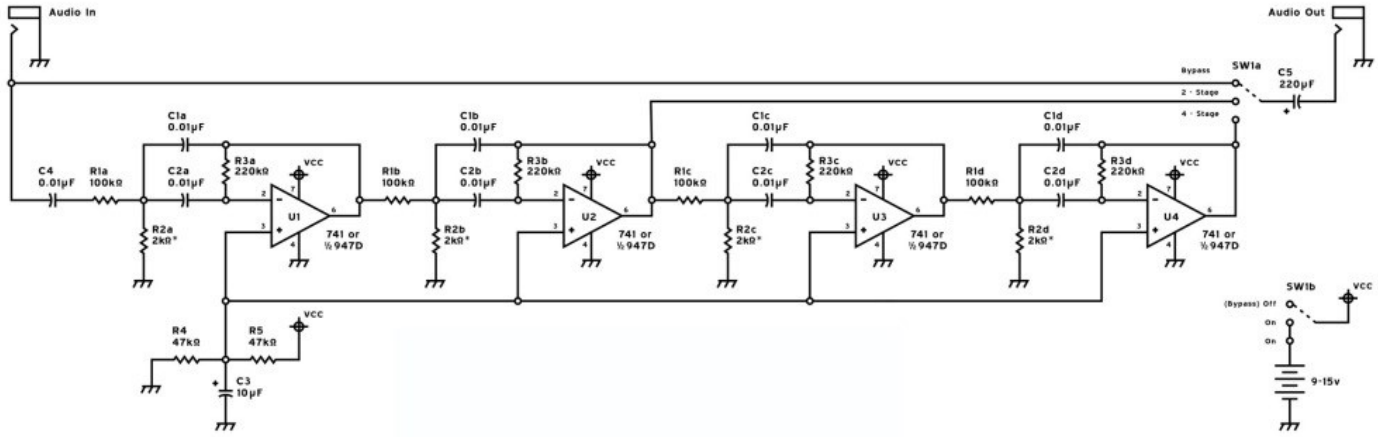
I chose K4ICY's design. You can view his website page at k4icy.com/cwfilter.htm. I am sure Mike won't mind me sharing the schematic here on hamradiooutsidethebox.ca. The circuit is based on a fairly standard op amp design but Mike does an excellent job of describing the operation and construction in great detail. I highly recommend you visit Mike's website to learn more.

My own version of K4ICY's CW filter employs a quad op amp chip. The filter is basically a 4-stage filter. Each stage is identical so construction is quite straightforward. I built the filter on a piece of perfboard that fits snugly inside the battery compartment of the FT-817.

An Audio Filter for the FT-817

My favourite radio for POTA activations is my Yaesu FT-891. I love it because of all the sophisticated IF filtering tools. I also own a Yaesu FT-897 which has pretty darn good "Digital Signal Processing" but it works at audio frequencies (AF) instead of intermediate frequencies (IF). Since the FT -817 has no filtering at all I had to build my own.





Of course, the battery holder must first be removed. After much agonizing I cut a small section of the battery cover away to allow the connections to audio in/out and power to be routed out of the case.

The performance of this circuit is stunning. Not only does it act as a very good filter it also serves as a zero beat indicator. When you are tuned in to exactly the same frequency as the station you are monitoring there is a marked increase in audio volume!

Quod Erat Demonstrandum

So I have now eliminated the two principal reasons why I quit QRP and maybe shouldn't have. Shall I now rejoin the swelling ranks of those who do more with less? Yes, maybe.

~ *John VA3KOT*

The dog that knew Morse code

When we refer to an amateur radio operator as "SK" we mean they are a Silent Key; they are deceased, gone to join the choir invisible, ceased to be, etc. The term derives from the days when most hams were CW operators. Their telegraph keys were no longer clattering and sending streams of dits and dahs up into the ionosphere.

So how is it possible then that a small dog could be "SK"? This is the story of Trunkles, the English Setter and best friend of he who describes himself by means of the perpendicular pronoun, designated in Morse Code by "didit".

Trunkles and I were inseparable. We hiked hundreds of kilometers of trails together from Eastern Ontario to the Rocky Mountains of British Columbia. Whenever I went downstairs to my basement shack, Trunkles would follow. I would settle into my operating chair, tune up on the bands and make CW contacts. Trunkles would curl up behind me on a mat and follow me back upstairs when I had finished.

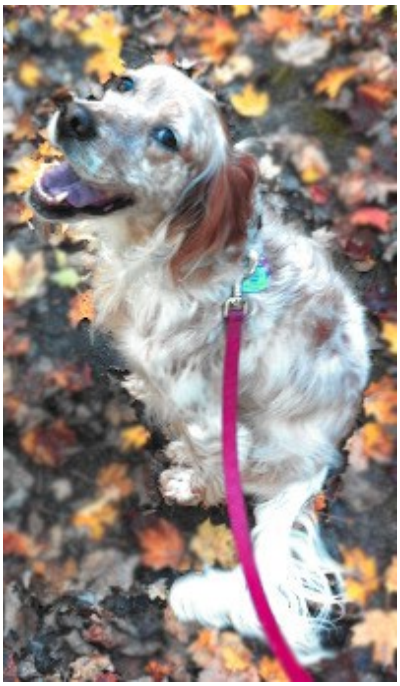
Every Wednesday at 5:00pm I would check into a CW net on 80m. The net lasted about 30 minutes and as we were finishing up and sending our 73s, Trunkles would leap up excitedly and begin pushing at my arm with her nose while wagging her tail so furiously that her whole rear end would swing from side-to-side.

I hasten to add that this behaviour ONLY happened at the end of this one net. I operated CW almost daily but there was no similar canine reaction to any of my other operating sessions.

Trunkles' excitement was driven by the expectation of receiving her favourite treat after the net on Wednesdays. There are two possible explanations. Perhaps dogs have an accurate internal clock and can tell when 5:30pm on a Wednesday rolls around. Or perhaps she would listen to the code and recognize the callsigns of the two friends who always joined the net.

I know which explanation I prefer. Trunkles became a silent key on 22nd November 2021 at the ripe old age of fifteen.

~ *John VA3KOT*



Microphone Hanger for Backpacks

Bob maintains a great blog site at https://www.k0nr.com/wordpress/.

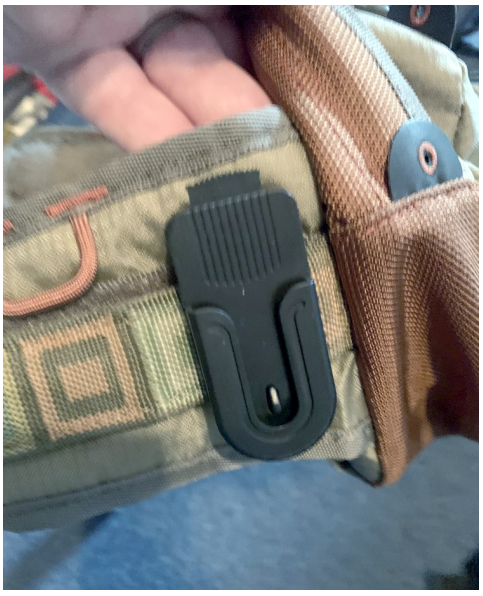
Contact Bob at bob@k0nr.com.

You can also check out his book VHF, Summits and More: Having Fun With Ham Radio.

My standard SOTA setup is a Yaesu FT -90 compact VHF/UHF transceiver stuffed into a fanny pack with its Bioenno battery pack. The fanny pack is a pretty nice flyfishing pack that I position on the front side of me so I can easily see and operate the radio. I am usually holding the 2m or 70 cm Yagi antenna and talking on the microphone.

Clip for microphone

These clips used to be quite common on older cellphones (pre-Smartphone) and they fit the standard microphone button.



I've been looking for a way to clip the microphone onto the pack. Typically, what happens now is I drop the microphone and it gets banged up when it hits the rocky ground. I needed a way to easily hang it on the side of the pack. I recalled having an old cellphone belt clip that accepts the standard button on the back of a mobile microphone, but I couldn't locate it. However, I did find one on Amazon.

Typical Yaesu mobile microphone hanging from the clip.

I clipped it onto my fanny pack and the Yaesu microphone hangs quite nicely on it. This clip can be used for other applications…anywhere you want to hang a microphone onto a backpack, belt, or whatever. Depending on your station configuration, this may be useful for all kinds of portable operating: SOTA, POTA, and satellites.

~ 73 Bob K0NR

Who Does VHF SOTA?

Who really uses the VHF and higher bands (>50 MHz) for Summits On The Air? Last year, I pulled some data from the SOTA database and provided some analysis.

Here is the short story:

Roughly 20% of the SOTA contacts worldwide are on VHF/UHF frequencies and about 90% of these are on 2m FM.

So that's the information that is in the official SOTA database. For SOTA, I pretty much operate on the VHF/UHF bands so over time I've noticed that four types of operators use VHF/UHF for SOTA. Of course, this is based on my own observations, mostly in Colorado but also in other states.

Beginners

Many newer hams or new-to-SOTA hams just grab their handheld radio and go do a SOTA activation. This makes a lot of sense, assuming there is reasonable 2m FM simplex activity around. Summits that are within VHF range of large population areas usually work quite well. A Technician license is sufficient to have fun with this mode (both activating and chasing). If you are new to ham radio, like the outdoors, and have SOTA summits in your area, this is a fun activity to pursue!

HF+VHF Ops

Many SOTA activators are after longer distance contacts so they naturally gravitate to the HF bands. Some leave VHF behind, as they focus on HF operating. However, many SOTA activators and chasers keep a VHF radio in their toolkit, often treating it as an add-on to their HF activity. Sometimes the VHF radio becomes the fail-safe mode if things are not working well on the HF bands. Sometimes, I hear activators say something like "the HF gear was just not working for me today, so I had to use my HT to log four contacts."

Non-SOTA Ops

There are quite a few hams out there on 2m FM that are not really focused on SOTA. They like to hang out on 2m FM simplex, especially 146.52 MHz, to chat with whoever comes along. In the backcountry, this may include hikers, snowshoers, skiers, 4WD enthusiasts, campers, etc. It also includes hams just hanging around the shack with a radio or scanner monitoring 2m FM. Announce that you are on top of a summit and these folks are happy to contact you.

VHF Enthusiasts

Finally, there are VHF/UHF enthusiasts that like the combination of higher frequencies and mountaintop operating. The effect of Height Above Average Terrain (HAAT) has a huge impact at these frequencies. A 5-watt handheld (HT) might be limited to a few miles on flat terrain, but from the top of a summit, the range extends dramatically (50 to 100 miles). Improve your station and 200-to-300-mile contacts are achievable. Most of this action is still on 2m FM but adding in additional bands (70 cm, 23 cm) and modes (CW, SSB) provides another challenge. Chasers are included in this category as well…there are VHF/UHF enthusiasts that are challenged by working distant summits from home.

Summary

These are the four categories of folks I usually encounter on the VHF/UHF bands when doing SOTA. Do these match your experience? What did I miss?

~ 73 Bob K0NR

This book is an easy-to-understand introduction to VHF/UHF ham radio, including practical tips for getting on the air and having fun messing around with radios. Learn about FM, SSB, repeaters, equipment, band plans, phonetics, portable operating, Summits On The Air (SOTA) activations and more.

Thomas Witherspoon K4SWl / VY2SW

QRPer.com

A few field radio gift ideas for less than $100!

I received an email from a reader's spouse asking about gift ideas for the holidays and beyond; ideas that could not only be used this month, but also tucked away for the future. They weren't looking for the obvious things like a transceiver–they were looking for accessories that might enhance their significant others' field radio fun.

Being the enabler I am, I was happy to oblige and, in fact, decided to turn my reply into a post (since it quickly turned into a very long email) with their permission. For obvious reasons, I'm keeping their ID secret!

Here's a rather random sampling of things that came to mind. I tried to limit this to items that retail for less than $100 US. Note that some of these product links are affiliate links.

A quality LiFePO4 battery

Being a QRPer, I don't need a large battery to enjoy hours of radio fun per charge. My favorite battery chemistry is LiFePO4 due to its weight, safety, shelf life, and recharge cycles (which is in the thousands as opposed to hundreds).

For me, a 3Ah battery is more than enough capacity to keep my QRP radios on the air for 3-5 activations per charge (depending on length of activation, etc.).

I'm a big fan of Bioenno batteries. Their customer support is excellent. You can purchase their 3Ah 12V battery for $64.99 US including the charger. If you already have a charger, the battery alone is $49.99. Click here to check it out.

If your significant other likes to push 100 watts, consider a larger capacity battery. I also have a 15Ah Bioenno battery for this purpose, though it exceeds the $100 gift price threshold). Click here to check it out.

A very affordable Li-Ion rechargeable battery

One of the most affordable rechargeable battery packs for the QRPer in your life is the TalentCell Rechargeable 12V 3000mAh Battery Pack. This pack typically costs around US$30 and is sometimes even less expensive.

This little pack is great because it will not only output 5V to recharge USB devices, but it also outputs 12 volts which is brilliant for QRP radios like the Elecraft KX series, TX -500, FT-817/818, Mountain Toppers, Penntek TR-35, Venus SW-3B, and many others. I actually now pair this with my QCX-Mini. The battery comes with the charger and standard barrel connectors on the included DC cord which fits Elecraft and Penntek field radios among others.

This is a small battery, so can only be paired with efficient QRP radios.

While I don't consider this a high-quality solution like a Bioenno battery, it is insanely useful and affordable. Click here to check it out.

Morse Code Keys!

I could easily write a series of articles about Morse Code keys. That's not what you're looking for, though, right? You want some quick suggestions. Here is a sampling of some of my sub $100 favorites listed in alphabetical order.

- CW Morse N0SA SP4 Precision paddles ($82.95 or $109.95 with steel base): These are the latest paddles from CW Morse. I love them. Click here to read my short review.
- CW Morse "Pocket Paddle" ($44.95): This must be one of the most popular set of portable paddles on the market. They're affordable and very well-built! There are several versions and colors available.
- CW Morse Outdoor Double Paddle With Steel Base ($74.95): I've been using these a alot lately when operating on a picnic table. The heavy steel base allows for one-handed operation.
- N6ARA TinyPaddles ($24.95): I believe every CW field operator should carry a set of N6ARA's TinyPaddles. They were originally designed to be backup paddles, but I know many ops that use them as their primary set in the field!

If your budget is flexible, you might also consider these paddles which are still less than $200:

[above] The TalentCell battery and
[below] One of several recommended Morse keys

~ Thomas (VY2SW / K4SWL)

Reprinted with permission of the author. Please visit Thomas' page to comment and to view more photos:
https://qrper.com/2022/08/fighting-mozzies-and-logging-pota-hunters-at-cap-touremente/

- CW Morse CNC Machined Aluminum Paddle ($129.95): These are very high quality, durable CNC machined aluminum paddles. Last week, I dropped them on a concrete floor from about 5 feet and they survived without even a scratch.
- BaMaKeY TP-III Ultra-Compact Paddles (155 EUR): This is a high-quality, lightweight portable key that I also recently purchased. I've a number of friends that love their TP-III paddles!

Okay, so if you don't mind pushing more than $200, I highly recommend any key made by the amazing Begali family. Their Simplex paddle was my first set of paddles and I still use them today. I plan to buy their Traveler next year. They've a massive selection of models and styles.

An arborist throw line kit

Trees–if you have them where you live–are brilliant antenna supports. In my opinion, the easiest, most reliable, and simple way to get an antenna in a tree is with a quality arborist throw line.

I've written an article about throw lines which goes into more details and offers a number of options.

Assuming you might be purchasing this as a gift for someone, you simply can't go wrong with the throw line kit in the photo above.

It consists of two components: a Weaver arborist throw line & weight and storage bag. Together they cost about $46 US and will last for years. A very solid and high-quality (US-made!) gift.

ARRL Handbook: 100th Anniversary Edition

I firmly believe every amateur radio operator should have a copy of the ARRL Handbook. I have a 1994 and 2003 edition, but will also purchase the 100th Edition.

Click here to check it out at the ARRL.

There are two print versions: a paperback collection for $69 US and a hardback version for $79. Personally? I'll be going for the hardback version! Both come with an electronic copy of the handbook as well.

If you don't want a "dead trees" copy of the Handbook due to space constraints, it's surprisingly affordable ($10!) via the Kindle platform. UPDATE: It appears this is $10 per volume, not for the entire handbook. I think it would be better to simply purchase the paperback or hardback version that comes with an electronic version.

A good field antenna

You can never have enough antennas, right? Right!

There's no way I can include all of the antennas on the market under $100–there are so many. That said, here's a sampling of antennas I use regularly:

- PackTenna Mini End-Fed Half-Wave ($89.95): This is one of my favorite field antennas. It's super compact, has a built-in winder, and is made of very high quality components.
- PackTenna Mini Random Wire Antenna ($94.95): The form factor is identical to their EFHW, but this one is designed with a 9:1 toroid. It's a great antenna that can easily work from 40 – 6 meters if you have an ATU.

- TufteIn EFRW QRP Antenna Long Wire ($84 assembled with 35′ radiator and 17′ counterpoise): This is another high-quality lightweight random wire option. I've had loads of fun using this wire antenna in the field. As with any random wire antenna, an ATU is necessary. Note that Tufetln also offers an EFHW antenna!

If you like to build your own antennas, here are a couple excellent kits:

- K6ARK Antenna Kit ($21): This is a fun little antenna kit to build. At time of posting, it's out of stock, but I know Adam produces these regularly. Since this antenna kit requires working with very small parts, it might not be for a beginner, but it's very affordable and one of the smallest antennas you could ever take to the field.
- KM4ACK 40M EFHW Kit ($39): This must be one of the easiest antenna kits on the market. The kit is complete and there's a comprehensive video that shows how to build it. Click here for a short post about this antenna kit.

Again, I know I've missed listing a number of excellent antennas on the market–this is merely a short sampling of some of the antennas I've recently built.

A headlamp

As I mentioned in several previous posts–especially this one–I believe a headlamp is an essential part of any field radio kit.

I like a good quality headlamp that is USB rechargeable. One of my favorites in terms of price and quality is the Nitecore NU20 Rechargeable LED Headlamp. I have two of these and have also I've purchased several as gifts for friends and family.

I also have a Petzl ACTIK CORE Headlamp and Petzl NOCTILIGHT Headlamp Case. The headlamp is superb and when combined with the Headlamp case/diffuser it makes for a compact general purpose lantern. I carry this Petzl combo in my EDC pack.

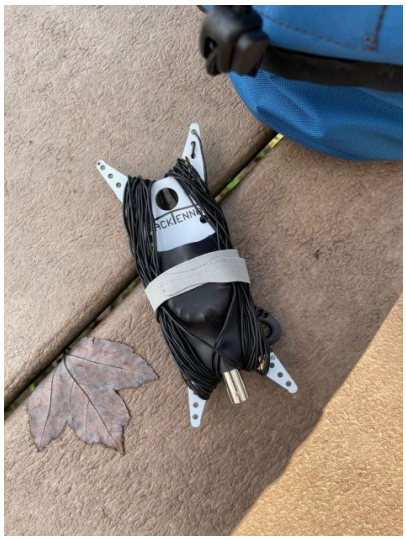
A QCX-Mini

True: I implied no transceivers in this list, but the QCX-Mini is a superb little QRP mono-band CW radio that's insanely affordable.

The kit version can be purchased for as low as $55. If you purchase the kit, I would suggest adding the $20 aluminum enclosure and the $6 QCX AGC model, though. You can also order it fully assembled for an additional $45. Click here to check it out!

If you purchase a fully-assembled version, you'll need to specify which band you'd like. If your significant other likes to activate summits, I'd suggest getting the 20 meter model. If they like activating parks, the 20 meter, 30 meter, and 40 meter models are all great options.

~ Thomas K4SWL

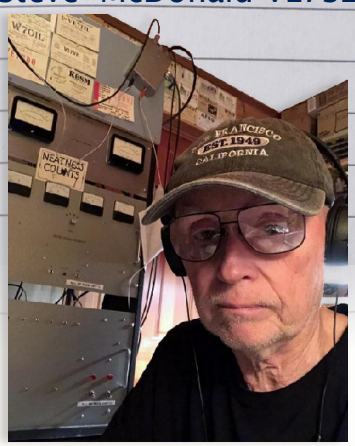


[above] One of several field antennas and [below] the QCX-Mini

VE7SL's Radio Notebook

Building... '29 - Style

Steve McDonald VE7SL



Reproduced with the author's permission, Visit The VE7SL Radio Notebook at: The VE7SL Radio Notebook and Steve's blog at VE7SL - Steve - Amateur Radio Blog

As mentioned in an earlier blog, the annual winter Bruce Kelley (BK) QSO Party, usually spurs some new construction of transmitters styled after those that were popular in the late 20's and early 30's. The main stipulation for entry into the two-weekend affair is that transmitters must be self-excited (no crystals) and use tubes that were available in 1929 or earlier.

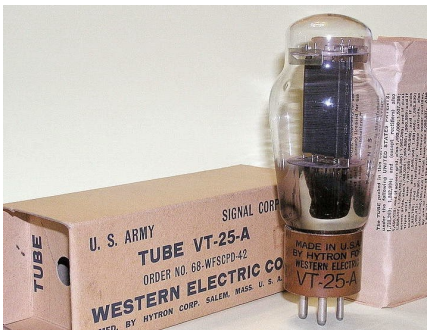
Initially this might seem a difficult task, and that was my first reaction when first learning of the vintage operating event. Once I had learned more about these types of transmitters and actually listened to the BK action, I knew that it was something that I really wanted to do. After seeing several inspiring videos from Neil (WØVLZ) and Joe (N2OUV), demonstrating their homebuilt '29 TNT transmitters, I knew it was something that I really had to do! Perhaps the videos will grab you as well:

See more of this transmitter in action here.

One of the first things that might seem impossible to obtain would be a

suitable tube that was available in 1929. Most of the tubes used in transmitters back then were designed for receivers, usually audio tubes that were pressed into RF oscillator or amplifier service. In the dirty-thirties, larger RF tubes were expensive and beyond the reach of most amateurs unless they had deep-pockets.

Tubes commonly found in BK transmitters are the type 10, 210, 45, 245, 27 and the 227. All of these types are still available today with some being more costly than others.



The most common tube is the type 10 or 210 which is also available in a military format, still NIB, as the VT-25.

This is the same tube used in the WØVLZ transmitter.

This tube can easily handle the 25W power requirements imposed by the BK and then some.

Typical prices range from $50 and up.

The next most popular is the 45 or 245, which is pretty well maxed-out at around 5-7 watts. The cost of a 45 is about half that of a VT-25.

The widely available and inexpensive 27 / 227 will produce 2-4 watts of output… more than enough to work across the continent under normal conditions. The low cost (around $5) makes these particularly attractive for the first-time builder as a transmitter using a pair of these (or more) in parallel or in push-pull is an easy way to get started.

Here is a list of popular tubes that could be used for BK-eligible '29-style transmitters. There are probably more but these are the ones seen most often:

Suitable tubes are always available on e-Bay and from dedicated online tube-sellers. A quick Google-search will turn up several sellers, with prices and condition. Of course, one of the first places to look should be any of your ham friends with deep junk-boxes, especially those that have been building or amassing parts for many years. Check out the next ham flea market… especially those dusty old boxes under the seller's table. And...there are probably several hundreds of basements still filled with suitable old parts, just waiting to be liberated… seeking them out is all part of the '29 building fun.

1929 or Earlier

24
26
27
49
50
12A
71A
171A
01A
45
10
or any of above preceded by a "2"
211
865

Once a decision has been made to go forward with a '29 project, the first thing is to decide on the type of transmitter to build. There were three popular designs back in the late 20's, each with their own pro's and con's. I'll tell you more about these next and give you a few suggestions for getting started.

In the meantime, see what your 'oldest' ham acquaintance might have in his basement and keep an eye-out for any ARRL Handbooks from the early 30's as they are full of valuable building ideas… and you may wish to check-out K7JPD's ideas for finding old parts.

~ Steve VE7SL

Foundations Of Amateur Radio

Onno Benschop
VK6FLAB

What's in a VFO?

To listen to the podcast, visit the website: http://podcasts.vk6flab.com/. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

Full instructions on how to listen are here: https://podcasts.vk6flab.com/about/help

One of the many acronyms that define the world of amateur radio is VFO. It stands for Variable Frequency Oscillator. That doesn't explain much if you're not familiar with the purpose of it and just how special this aspect of amateur radio is.

Much of the world of radio beyond our hobby, like broadcast television, WiFi and Citizen Band or CB, to name a few, uses radio spectrum in a particular way. On a television you change channels to switch between stations. Similarly, a WiFi network uses specific channels to make your wireless network a reality and the same goes for CB, different channels to make yourself heard.

Looking specifically at CB for a moment, if you look at channel 8 for example, depending on which type of equipment you have, your radio might be using 27.055 MHz, or 476.575 MHz, or 476.6 MHz. Each of those frequencies can be described as CB channel 8. The first is on the 27 MHz or 11m band, the second is if you're using a 40 channel radio, which is now depreciated and the third is if you're using an 80 channel radio.

If you look at digital broadcast television, channel 8 is on 191.5 MHz. On WiFi, channel 8 is on 2.447 GHz or 5.040 GHz.

You get the point, depending on where you are as a user of radio spectrum, channel 8 might mean a whole host of different things and as I've described with CB radio, that might even change over time.

Harry Potter needed magic to reach Platform Nine and Three-Quarters at Kings Cross Station to get to school. In a channelised world, getting to an in-between frequency is not possible if you're using licensed equipment, unless you're a radio amateur, then you can use magic to get into the gaps. That magic is called the VFO.

You might recall that our radios use many different frequencies internally to be able to filter out specifically what signal you want to hear. Most of those frequencies are fixed, in fact in the vast majority of cases these are actually tuned and calibrated to work in a very specific way.

The one exception is the VFO, it's by nature variable. It's likely

calibrated, but it's not fixed and that allows our community to tune our equipment to any frequency we desire.

The traditional user interface for this is a big knob on the front of your radio, colloquially referred to as the dial, as-in turn the dial to change frequency.

This allows us something quite rare in radio land. We can be frequency agile. It means that if there's interference at a specific frequency, we can tweak our VFO and slightly modify where our radio is tuned. You use this almost subconsciously when you're on HF trying to tune to a particular station.

In the world of software radio there's likely no knob. You type in a number and the variable frequency oscillator in the radio is tuned to another frequency and the output signal, or transmit signal if you're making noise on-air, changes to another frequency.

Digital modes like WSPR, which generally use a very specific frequency also vary that frequency but in a different way. You set your radio to the appropriate so-called dial frequency, let's say 28.1246 MHz on the 10m band and then the software alters the signal by up to 200 Hz to change within the available audio range of your radio, altering between a low of 1400 Hz and a high of 1600 Hz, making the actual WSPR frequency on 10m between 28.1260 and 28.1262 MHz.

I'm mentioning the WSPR example because while we're frequency agile in our hobby, we do use channels as well. There's a specific set of frequencies set aside, channels if you like, for WSPR, FT8 and other modes. We do the same on the 2m and 70cm bands where we have rules for where repeaters are allowed to be.

It means that we get the best of both worlds. We have the stability and institutional knowledge where repeaters or some modes go, but we also get to play in any spot we want.

For example, there's nothing stopping me and a friend setting our radio to some random frequency within our license allocation and outside pre-allocated space and run a WSPR transmitter there. Only the two of us will know about it, well at least at first, but it allows us to experiment away from any other users who might experience interference from our tests and exploration.

The VFO is what makes our hobby so very interesting and it's what makes it possible to do weird and wonderful experiments.

~ I'm Onno VK6FLAB

The nature of learning things

Recently I discussed the concept of a VFO, a Variable Frequency Oscillator. It's an essential building block for our amateur radio community. In describing the idea behind it, while making an error in one of the CB radio frequencies, thanks to Ben VK6NCB for picking that up, I skirted around how a VFO actually works.

In reality the VFO is a collective term that describes a whole range of different methods to vary a frequency. Naturally I continued my exploration and discovered a whole range of documentation on the subject. I even started writing about how one common method, a Phase Locked Loop or PLL, works and how a VCO, a Voltage Controlled Oscillator, operates as part of that. I'll come back to those shortly.

In doing my reading, since, as is often the case, I use my weekly contribution to the world as a method to learn things. I'll investigate a topic and attempt to describe who came up with it, what it means, how it works and what its place is in the world, the who, where, why and what of it, if you like. I suspect that comes from my very first introduction to broadcast radio where that was one of the very first things I was taught, thirty years or so ago.

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: http://amazon.com/author/owh. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: @vk6flab or check the website for more: http://vk6flab.com/

If you'd like to join a weekly net for new and returning amateurs, check out the details at http://ftroop.vk6flab.com/, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: https://www.facebook.com/groups/foundations.itmaze

This podcast episode was produced by Onno (VK6FLAB). You can find more at http://vk6flab.com/

If you've followed along for the decade I've been at this you'll know that I also intersperse such learning with observations about the things that I'm interested in. This is such an observation, a meta view if you will.

I discovered somewhat to my chagrin that the ways that an essential component of our hobby, a system called a Phase Locked Loop, was described in such academic terms, complete with formulas and detailed circuits and even component lists, spread over pages and pages of verbiage, or explained in YouTube videos lasting an hour or more. Of course there were some little gems, ElectronicNotes on YouTube manages to cover the basics in little over six minutes, but that's a rare example.

It reminded me of a website that I've been using to fill in the gaps in my understanding of SDR or Software Defined Radio and Digital Signal Processing or DSP. The PySDR.org site is an online textbook written by Dr. Marc Lichtman. He says about his method: "Instead of burying ourselves in equations, an abundance of images and animations are used to help convey the concepts [...]"

My weekly efforts have always attempted to do exactly that and I found myself in a place where such a thing didn't appear to exist for the concepts behind the PLL and VCO. My obvious response to that would be to write the missing document and as I said, I have a first draft of it sitting on my computer.

There's only one problem.

I don't yet "grok" the concepts. If you're unfamiliar with what grokking is, it means to understand intuitively and emphatically. It also means that unless I can describe it in less than a single page of A4 paper I don't understand what I'm saying and you'll get bored waiting for me to make a point.

Here's my point.

How do you learn concepts? What is it that you do to discover new topics of interest and how do you progress through the various stages between discovery and grokking?

For me it's about puzzle pieces. It's always been puzzle pieces. Little nuggets of information, almost trivial on their own, but after a while you get to a point where you have enough of them that you can start joining them together to grasp a more complex concept.

Here's a puzzle piece I discovered today.

Impedance: The difference between an explosion in air and one under water is impedance.

It's little concepts like that which make me get out of bed and discover what's on the horizon next. I'm also learning about double and triple conversion superheterodyne radio which I believe has a one-on-one parallel application in Software Defined Radio and Digital Signal Processing. Once I figure out how to describe it to you, I'll let you know.

The point of all this is that learning things is as much about understanding as it is about explaining.

Feel free to point me at new and interesting basic concepts.

~ I'm Onno VK6FLAB

80m ARDF Equipment

Always Find The Source

80M Fox Transmitter

Contact John for pricing and availability - JohnVA7XB@gmail.com
Cost CAD $99 + Shipping

The new ARDF fox is a highly configurable transmitter with the following features:

- Configurable using a serial terminal through the USB port on a PC
- Configurable call sign identification, CW speed and repetition frequency
- Adjustable fox number from 1 sending “MOE” to 5 sending “MO5”
- Configurable transmission modes
  - Standard (10wpm, on 1 min, off 4 min)
  - Alternate (10wpm, on 1 min, off 1 min)
  - Sprint (10wpm, on 12 s, off 48 s)
  - Fast sprint (15wpm, on 12 s, off 48 s)
- Beacon mode sending “MO” at 10wpm continuously
- Spectator mode sending “S” at 15wpm continuously
- Low battery mode sending MOx once every 5 minutes
- Start of event timer configurable up to 120 minutes
- Start button to synchronize multiple foxes
- Optional short pre-event transmissions one hour before the event start with configurable CW speed
- Flashing LED showing status
  - waiting to begin delayed start – rapid flashing
  - running – on continuously
  - CW transmissions – flashing with CW timing
- Debug mode providing progress reporting via the terminal

Frequency: 3.579 MHz Range: 300 m

Long Range (1300m) factory option available at extra cost - Contact us

The TX80M manual is available at: http://www.rx80m.com/resources/ARDF-TX-Instruction-Manual---1.003.pdf

KB6NU's Column

Dan Romanchik, KB6NU

JA1NUT: Two Issues in Morse Code Learning

When he's not trying to figure out which way current flows, Dan blogs about amateur radio at KB6NU.com, teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com.

On the Long Island CW Club's mailing list, someone posted a link to a blog post by Shin, JA1NUT, Two Issues in Morse Code Learning. JA1NUT is a great operator, so his advice is well worth taking.

The first issue is whether or not learning code using software is a good idea. Shin writes, "I would question if it is the best or the only way to learn it. Learning through software may help people a lot to remember all characters in Morse code in the beginning. After that step, is software learning ideal way or not, I wonder."

I agree with JA1NUT that using software to get started is fine, but at some point, you have to wean yourself off of whatever software you're using and get on the air. I think you'll get faster quicker if you do. Just bite the bullet and do it. After all, the point of learning the code is to make on-air contacts, isn't it?

The second issue is whether or not it's a good idea to advise new operators to copy words. Shin is not so sure that it is. He writes:

> *"I guess advising that way [learn to copy words instead of characters], the senior operators are not conscious of what's going on in reception process. We are taking the meaning of the message at every moment. When we copy a part of the word being sent, we subconsciously try to read the latter part of the word. We guess what word should follow in the context. Reading a sentence or even a whole message, we are guessing what to come next from the context. It is done almost unconsciously."*

I say something similar in my blog post, Another perspective on copying CW in your head. I think what's going on is more complicated that copying words, and aside from some simple, common words, I don't copy words in my head.

In another blog post, Become a CW head case, I repeat some advice from the Malta Amateur Radio League. They write:

> *"Listen for meaning. The goal is to learn to listen to the code as you would to the spoken word.*

Eventually the sound will trigger your consciousness just as the spoken word does."

I end that second blog post with this paragraph:

"I know a lot of this advice is kind of nebulous. Much of it is anecdotal, and as I said before, what works for one person may not work for another. I know you're all probably tired of hearing this, but the best advice, whether it be for learning the code, learning to copy code faster, or learning to copy in one's head is to just keep practicing. It's just like any skill whether it be bowling or woodworking or playing a musical instrument, you gotta work at it."

~ Dan KB6NU

ICQ Podcast Episode 391 –
Kick Start Ham Radio for 2023

In this episode, I join Martin Butler M1MRB, Caryn Eve Murray KD2GUT and Ed Durrant DD5LP to discuss the latest Amateur / Ham Radio news. Topics we discuss in this episode include:

- Dr. Ulrich Rohde, N1UL/DJ2LR/DL1R, to Be Inducted to the Indian National Academy of Engineering
- YOTA Month
- Big Promise from Ultra-Tiny Battery
- Santa HF Net is Coming to Town
- Filmmaker makes a Documentary – Documentary makes a Future Ham

This episode's feature is Kick Start Ham Radio for 2023

Social Reminder

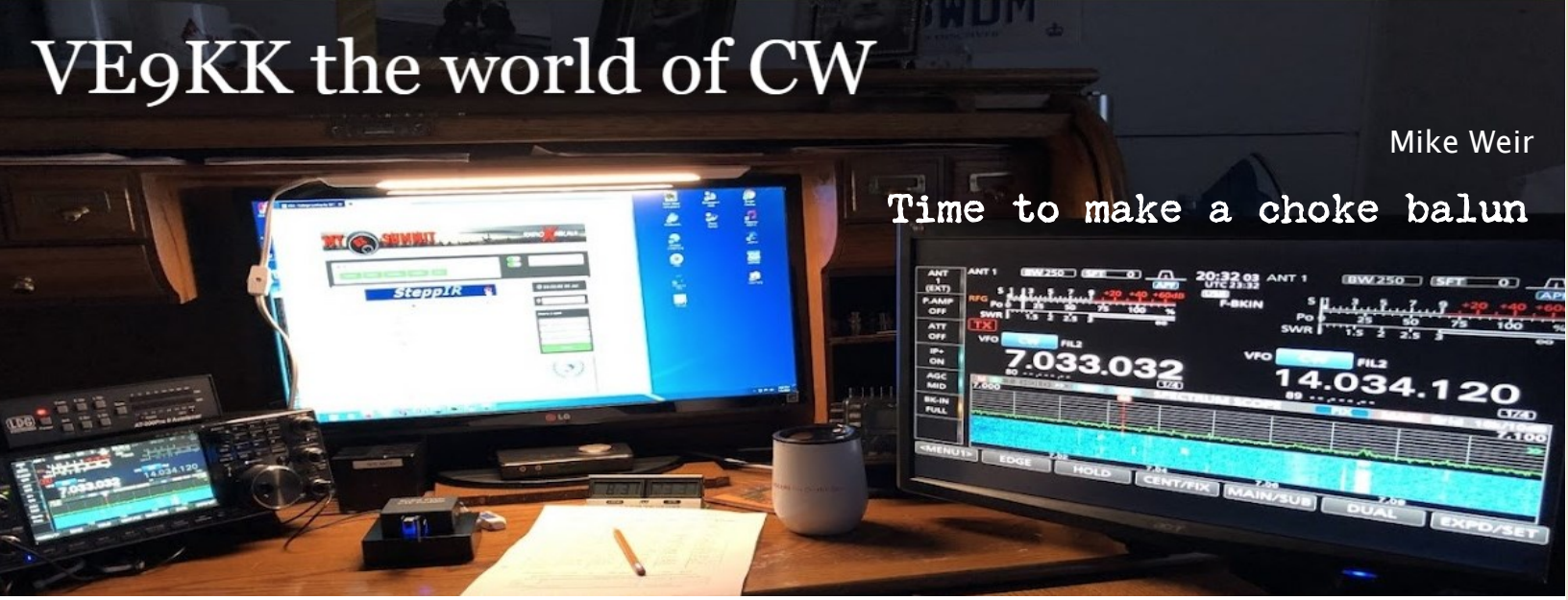
The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon.

Bring your ham issues, our Elmers will try to help you sort them out.

VE9KK the world of CW

Mike Weir

Time to make a choke balun



In your ham radio adventures, you may have heard the words..choke balun, feedline isolation, common mode choke or a 1:1 balun. In my humble opinion different names for the same device. These devices for the most part are present in a system to control common mode currents. I am not an engineer just a simple ham guy trying to sometimes understand some very complicated and technical explanations.

I hope to keep the next bunch of lines understandable. Here we go...what are common mode currents! Most ham use some form of 52 ohm coax as it's very easy to route, secure and can within reason be placed anywhere. Ideally, RF will flow out on the OUTER SURFACE of the coax INNER CONDUCTOR and flow back on the INSIDE SURFACE of the coax shield. This is what happens in a perfect world but if a system is unbalanced RF current will return on the OUTSIDE of the outer coax braid. It does not return but it radiates.

This is when we hams can experience RFI issues and these issues vary with the amount of common mode currents flowing on the outside of the shield of the coax. How does one control this common mode current? One very effective way is to introduce a common mode choke, 1:1 balun, choke, feed line isolation or whatever else it could be called.

In a previous post, I did go over how I installed a 1:1 balun at the antenna feed point of my Hustler 4BTV and that seemed to satisfy my RFI issues but further reading informed me that a choke balun at the radio feed point would be very advantageous. I ordered 2 FT240-31 mix toroids as I decided to make a choke balun instead of buying one. The two common mixes for HF toroids are 31 and 43. The difference being the 31 mix is effective from 1-300 Mhz and 43 is effective from 25-300 Mhz. I chose to go with the 31 mix and purchased 2 from a reputable dealer as not all toroids are created equal. I would be very wary if you find toroids at a very low price....just remember you get what you pay for. I ordered mine from Mouser Electronics Canada, part number 623-2631803802 made by Fair-Rite for 13.00 each.

I used RG8X coax to wind around the toroid but the issue with using a ring toroid compared to a split bead is I had to remove the PL-259 to wind the coax around the toroid and then solder the PL-259 back on. I intended to make 10 loops and for some reason, I ended up with 11 turns through the toroid. I then soldered the PL-259 connector back on but not before placing the barrel and coax spacer on....how many of us have soldered a PL-259 on and then realized we forgot the spacer and barrel!

Another advantage to having a choke balun at each end of the coax is that it helps remove some RF noise that is picked up on the shield of the coax.

~ Mike VE9KK

VE9KK the world of CW blog

No-Ham Recipes

Jeanne Gordon VA3WX

Oriental Salmon Supper

Here is a salmon casserole with veggies, pasta and a creamy dressing.

- 1 cup (250 ml) dry small pasta
- ½ green pepper, cut in diagonal slices
- 1 celery stick, sliced diagonally
- ½ cup (125 ml) light mayonnaise
- 7 ½ ounces (225 ml) canned salmon
- 1 small onion, peeled and cut into thin wedges
- ½ cup (125 ml) frozen green peas
- 1 tablespoon (15 ml) soy sauce
- 4 ounces (120 ml) canned, sliced water chestnuts, drained
- 2 tablespoons (30 ml) light, creamy salad dressing (Ranch style if possible)

Bake at 350F (180C or a very moderate oven)

Cook pasta, drain and set aside. Drain salmon, reserving juice, and break salmon into chunks. Mash the bones and put with the salmon chunks. In a little oil, saute green pepper, onion and celery for a few minutes, stirring frequently.

Mix cooked green pepper, onion and celery with peas and water chestnuts. Mix together the mayonnaise, creamy salad dressing, soy sauce and reserved salmon juice, then mix into vegetable mixture. Carefully fold in salmon chunks and pasta. Place in a lightly greased casserole dish. Bake for 40 minutes.

Makes 2 to 3 servings

~ Jeanne VA3WX

Orca DX and Contest Club

British Columbia QSO Party 2023

- **Stations in British Columbia contact other stations in the province as well as the rest of Canada, the United States and beyond.**
- **Stations outside British Columbia make contacts with VE7/VA7 stations.**

Original photo certificates for top scores in all classes of entry, BC and outside BC (state/province/DX). New photo every year! Collectible!

Special photo certificates for top score in each federal electoral district in BC. (BC stations only)

Plaques offered in 10 sponsored categories: Top YL, Top BC single-op, Top BC multi-op, Top US, Top Canada outside BC, Top DX, Top Mixed Mode, Top CW, Most Federal Districts Contacted and Top Club in BC

BCQP is fully supported by N1MM contest logging software, CQ/X GPS enabled software for mobile contesting and N3FJP state QSO party logging program.

Follow links at http://orcadxcc.org/bcqp.html for rules, tools, helpful hints, and in-depth event analysis/reports and scores from past years.

BCQP is included in the State QSO Party Challenge.
Enter the competition by posting your BCQP score to 3830scores.com

Questions? eMail:
BCQP Contest Coordinator
Rebecca VA7BEC at va7bec@rac.ca

1600z February 4 to 0359z February 5
and
1600z February 5 to 2359z February 5

Ham Leftovers...

Ham Radio comes to the rescue… again!

A man in Nebraska showed again that when all other communications means fail, Ham Radio comes to the rescue. A Nebraska man drove his truck through Crazy Woman Canyon before he slid off the road on Halloween night. Unharmed, but without a functioning vehicle or a cell phone signal, Nicholas Cashoili turned to his ham radio. His "adventure" certainly got lots of local press coverage. See

http://www.buffalobulletin.com/news/article_e06f2164-66a2-11ed-9b17-3bbc9e8455cc.html and https://trib.com/news/state-and-regional/amateur-radio-aided-rescue-highlights-useful-hobby/article_74e7498e-6879-11ed-943e-9fd27a423e4b.html

Ham Radio equipped Balloon is on World Tour

Launched in California, it is already approaching China. See https://hackaday.com/2022/11/18/supercon-balloon-continues-its-world-tour/

Lithium batteries in the cold: A guide

As a lithium battery cools, the chemical process that creates electricity slows down and the internal resistance of the battery goes up. See the Off Grid Ham article at: https://t.e2ma.net/click/z9mugi/rn0jxs/fe9ugv

Computer power supply conversion with a 3D-printed case.

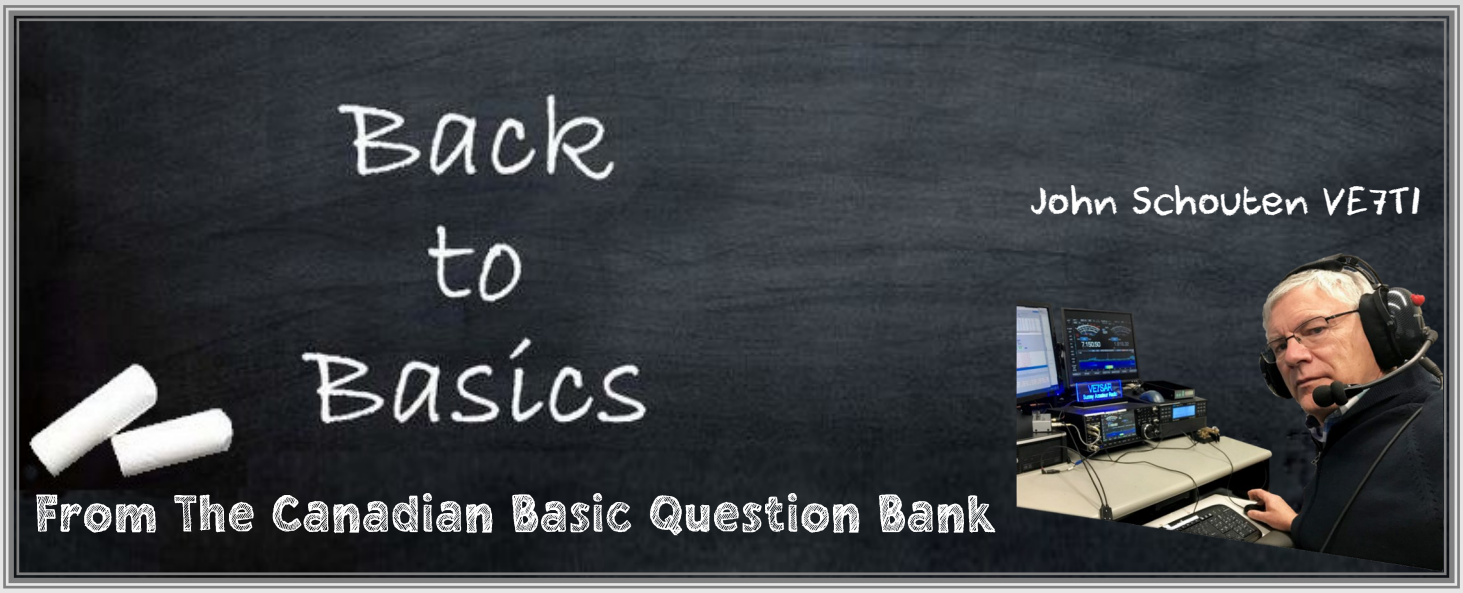
We've featured several versions of projects to convert a desktop computer power supply to a usable power source for your transceiver. Here is another that takes it a step further and also features a custom 3D-printed case: https://hackaday.com/2022/12/01/simple-atx-bench-power-supply-adds-variable-output/

The design features banana plugs outputting +12V, -12V, +5V, and +3.3V, with all outputs appropriately fused for safety. There's also a fused stepdown converter used to supply variable voltages as needed. Its original trimpot was replaced with a multi-turn pot for ease of control. To make everything work, a load resistor on the 5V circuit makes the power supply think it's hooked up to a motherboard. It's all wrapped up in a neat slant-sided 3D-printed case that fits onto the ATX power supply itself.

Email over APRS. You've got mail! on your radio!

Let's see if we can send and receive email using nothing more than a handheld ht/amateur radio. The APRS packet network is bridged to the Internet virtually everywhere, so why not leverage the two together? There are virtual radio callsigns out there anyone can talk to, including EMAIL, WLNK-1, and more.

Video: Let's do email!



Amplifier linearity and distortion

Linearity is mentioned in several questions of the Canadian Amateur Radio Question Bank. While it is often a familiar concept to HiFi enthusiasts, it is a topic that often needs further explanation, particularly to non-technical students. Linearity is important because it is closely tied to distortion and, in many instances, distortion causes interference.

Here are two of the applicable questions:

B-4-1-2 If an amplifier becomes non-linear, the output signal would:

A. be saturated

B. cause oscillations

C. overload the power supply

D. become distorted

And it is also mentioned indirectly…

B-1-6-3 Which of the following statements is not correct?

A. A radio amateur may not operate, or permit to be operated, a radio apparatus which he knows is not performing to the Radiocommunication Regulations

B. A radio amateur may use a linear amplifier to amplify the output of a licence-exempt transmitter outside any amateur radio allocations

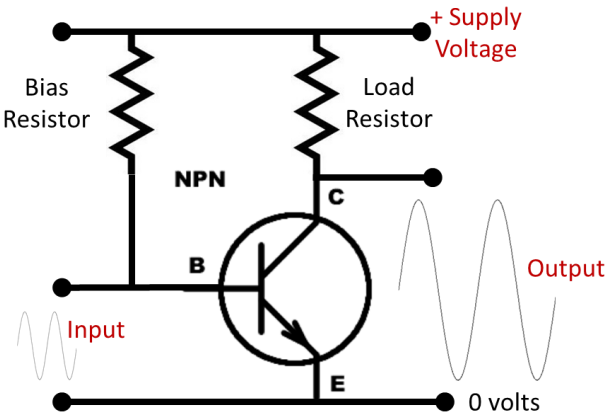
C. A considerate operator does not transmit unnecessary signals

D. A courteous operator refrains from using offensive language

Linearity refers to the ability of the amplifier to produce signals that are accurate copies of the input, generally at increased power levels. If an amplifier is 'linear', amplification, as a ratio of output versus input, will be constant regardless of frequency or amplitude of the input signal. Linearity is synonym with 'absence of distortion'. 'Non-linear' implies distortion. Load impedance, supply voltage, input base current, and power output capabilities can all affect the efficiency of the amplifier.

Consider the diagrams on the next page…

Simple common emitter amplifier

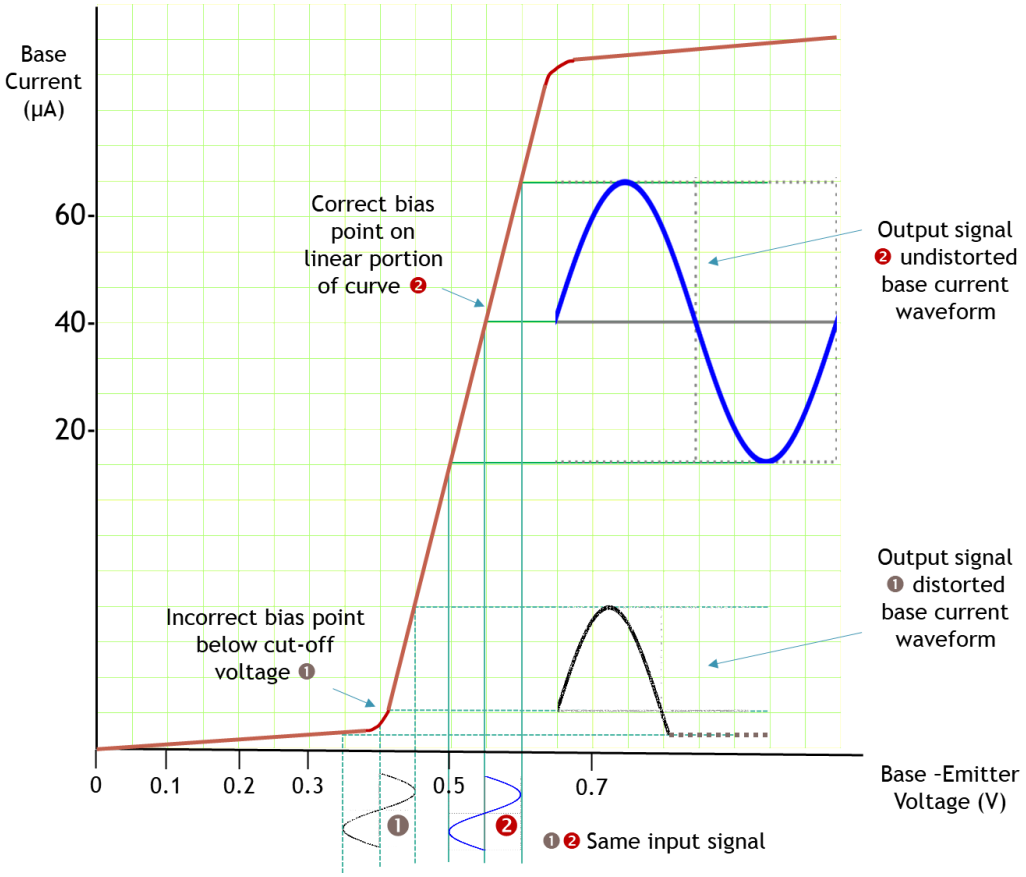


Amplifiers are needed in most pieces of electronic equipment, not only for sound and picture reproduction but also in control systems and communications. Most amplifiers are designed to be linear. That is, they provide constant gain for any normal input level and output signal and all amplitudes within an amplifier's operating range. If an amplifier's gain is not linear, the output signal can become distorted.

Therefore the design of an amplifier is aimed at producing a circuit that has a predicted gain over a particular band of frequencies with minimum distortion. The amplifier must also be stable and not prone to oscillation. Bipolar PNP or NPN transistors, FETs or vacuum tubes may be used in a wide variety of designs depending on their intended purpose.

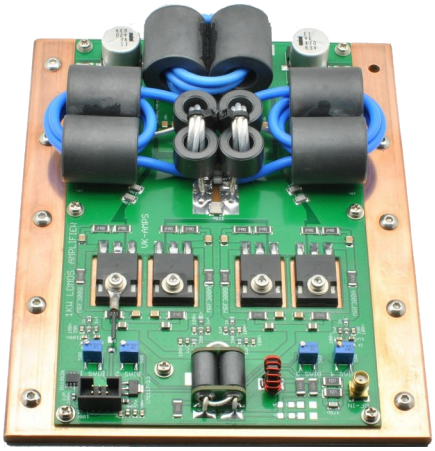
Consider the simple NPN common emitter amplifier shown above, consisting of a transistor and two resistors, and the graph below. If the device is not 'biased' correctly (meaning proper voltages at the terminals) then it cannot operate properly. Despite the same value signal fed in at the input (❶ and ❷), signal ❶ has only ½ the sine wave signal at the output, and is thereby distorted.

Proper engineering and design ensures that the amplifier operates at voltages that maximize the linearity; and to function correctly the amplifier should produce at its output ❷ an amplified version of the signal fed at its input ❷ without any distortion.



There are a number of amplifier classes providing various trade-offs between implementation cost, efficiency, and signal accuracy. Their use in RF applications is listed briefly below:

Class-A amplifiers are very inefficient, they can never have an efficiency better than 50%. The semiconductor or vacuum tube conducts throughout the entire RF cycle. The mean anode current for a vacuum tube should be set to the middle of the linear section of the curve of the anode current vs grid bias potential.



1 Kilowatt 6m linear RF power amplifier kit

Class-B amplifiers can be 60-65% efficient. The semiconductor or vacuum tube conducts through half the cycle but requires large drive power.

Class AB1 is where the grid is more negatively biased than it is in class A.

Class AB2 is where the grid is often more negatively biased than in AB1, also the size of the input signal is often larger. When the drive makes the grid become positive the grid current will increase.

Class-C amplifiers can be about 75% efficient with a conduction range of about 120°, but they are very nonlinear. They can only be used for non-AM modes, such as FM, CW, or RTTY. The semiconductor or vacuum tube conducts through less than half the RF cycle. The increase in efficiency can allow a given vacuum tube to deliver more RF power than it could in class A or AB. For instance, two 4CX250B tetrodes operating at 144 MHz can deliver 400 watts in class A, but when biased into class C they can deliver 1,000 watts without fear of overheating. Even more grid current will be needed.

Class-D amplifiers use switching technology to achieve high efficiency, often exceeding 90%, thereby requiring less power to operate, compared with that of other amplifier types. Because of the digital train used to drive the amplifier, many do not consider the Class -D amplifier a linear amplifier, yet many audio and radio manufacturers have incorporated its design into linear applications.

Although class-A power amplifiers (PA) are best in terms of linearity, their efficiency is rather poor as compared with other amplification classes such as "AB", "C". However, higher efficiency leads to higher nonlinearity and PA output will be distorted, often to extent that fails the system performance requirements. Therefore, class-AB power amplifiers or other variations are used with some suitable form of linearization schemes such as feedback.

Class-A amplifiers can be designed to have good linearity in both single ended and push-pull topologies. Amplifiers of classes AB1, AB2 and B can be linear only when a tuned tank circuit is employed, or in the push-pull topology, in which two active elements (tubes, transistors) are used to amplify positive and negative parts of the RF cycle respectively. Class-C amplifiers are not linear in any topology.

In Amateur Radio, some commercially manufactured one to two kilowatt linear amplifiers used still use vacuum tubes (valves) and can provide 10 to 20 times RF power amplification (10 to 13 dB). For example, a transmitter driving the input with 100 watts will be amplified to 2,000 watts (2 kW) output to the antenna. Solid state linear amplifiers are more common in the 1000-watt range and can be driven by as little as 5 watts. Modern power devices using LDMOS technology allow for more efficient, cost-effective linear RF power amplifiers for the amateur radio community.

Large vacuum-tube linear amplifiers generally rely on one or more vacuum tubes supplied by a very high voltage power supply to convert large amounts of electrical energy into radio frequency energy. Linear amplifiers need to operate with class-A or class-AB biasing, which makes them relatively inefficient. While class C has far higher efficiency, a class-C amplifier is not linear, and is only suitable for the amplification of constant envelope signals. Such signals include FM, FSK, MFSK, and CW (Morse code).

So, looking back at our initial questions,

B-4-1-2 If an amplifier becomes non-linear, the output signal would:

D. become distorted

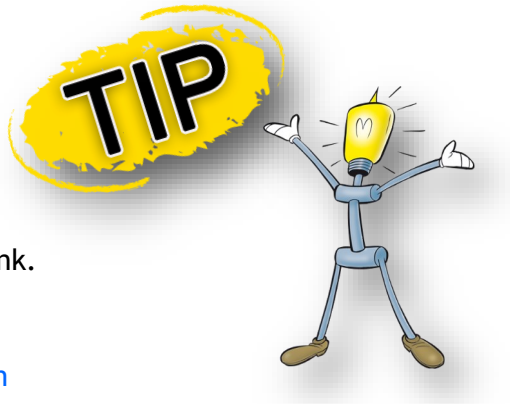
If an amplifier is 'linear', amplification, as a ratio of output versus input, will be constant regardless of frequency or amplitude of the input signal. Linearity is synonym with 'absence of distortion'. 'Non-linear' implies distortion; and

B-1-6-3 Which of the following statements is not correct?

B. A radio amateur may use a linear amplifier to amplify the output of a licence-exempt transmitter outside any amateur radio allocations

Because 'B' is not correct. Using an amplifier on what is normally a license-exempt transmitter is illegal: e.g., a Citizens Band radio. Article 31 of the Radiocommunication Regulations states "A person may operate or permit the operation of radio apparatus only where the apparatus is maintained within the tolerances set out in the applicable standards". Article 32 of the Radiocommunication Regulations which said "A person may operate radio apparatus only to transmit a non-superfluous signal or a signal containing non-profane or non-obscene radiocommunications remarkably was repealed in 2011 as inconsistent with the terms of the Canadian Charter of Rights and Freedoms.

~ *John VE7TI*



Study Links for more information

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank. http://tinyurl.com/CanadaBasicQB
2. Industry Canada (ISED) on-line practice page: https://apc-cap.ic.gc.ca/pls/apc_anon/apeg_practice.practice_form
3. The Amateur Radio Exam Generator is at: https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html
4. The ExHaminer Study software for Windows is at: https://wp.rac.ca/exhaminer-v2-5/
5. VE3YT has an excellent question-based guide available at ve3yt.com

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year free as a SARC prospective member!

Newly Licensed? When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive The Canadian Amateur magazine for one year.

SURREY AMATEUR RADIO

basiccourse

OBTAIN YOUR FEDERAL AMATEUR RADIO CERTIFICATE

7-WEEKS · ON-LINE · $80

Next course starts January 16, 2023—contact sarc@ve7sar.net

Includes classes, a comprehensive manual, videos and the exam fee

- Ideal for outdoors activities. Long range communications anywhere for free without commercial infrastructure
- Use satellite communication to speak around the world, perhaps even to an astronaut
- Participate in 'Radio Sports' like Contesting and Hidden Transmitter Hunts
- Enhance your personal and your community's preparedness in an emergency
- Use a radio, computer, smartphone or tablet for free worldwide voice and digital communications
- Practice an exciting hobby or start a career opportunity

City of Surrey
separ
Surrey Emergency Program Amateur Radio
https://separ.ca/

SARC
Surrey Amateur Radio Communications
http://ve7sar.net

HAMpuzzle V1.2

Our new students are often confused by the block diagrams for receivers and transmitters. A freeware program to practice assembling block diagrams for the Canadian Amateur Radio Basic certification exam runs under Microsoft Windows (but also works flawlessly on Ubuntu 10.04 + Wine 1.2.2)

HAMpuzzle V1.2 (2014 04) https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle12.zip

Be sure to download at least one set of Diagrams from the web page and deposit the bank(s) in the same folder as the program. For Basic: https://www.rac.ca/wp-content/uploads/2014/04/HAMpuzzle/HAMpuzzle_Diag_Basic.zip

Radio Amateurs of Canada is pleased to make the HAMpuzzle© program available and extends sincere thanks and congratulations to François Daigneault, VE2AAY, for writing and providing it as freeware to anyone wishing to download it.

~ RAC

Do you need more information about our courses?

https://bit.ly/SARCcourses or scan the QR-code with your smart-device camera

The great resistor

With surface-mount components quickly becoming the norm, even for homebrew hardware, the resistor color-code can sometimes feel a bit old-hat. However, anybody who has ever tried to identify a random through-hole resistor from a pile of assorted values will know that it's still a handy skill to have up your sleeve. With this in mind, I decided to super-size the color-code with "The Great Resistor".

How the resistor color-code bands work

At the heart of the project is an Arduino Nano clone and a potential divider that measures the resistance of the test resistor against a known fixed value. Using the 16-bit ADC, the range of measurable values is theoretically 0 Ω to 15 MΩ, but there are some remaining issues with electrical noise that currently limit the practical range to between 100 Ω and 2 MΩ.

The measured value is shown on the OLED display at the front, and in resistor color-code on an enormous symbolic resistor lit by WS2812 RGB LEDs behind. Watch the video at: https://youtu.be/2C_KpQk_63M

~ Dave Walker
https://hackaday.com/2022/11/05/the-great-resistor/

January 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 2023 Happy New Year!	2	3 1930 SEPAR Net **2000 SARC Net**	4	5	6	7 Coffee: 0700-0830 Denny's 6850 King George Blvd., Surrey OTC Open—10-Noon. Antenna Workshop Contest: ARRL RTTY Roundup
8 Contest: ARRL RTTY Roundup	9	10 1930 SEPAR Net **2000 SARC Net**	11 **SARC Meeting** 1900-2100	12	13	14 Coffee: 0730-0930 Denny's OTC Open—10-Noon Contest: NA QSO Party (CW)
15 Contest: NA QSO Party (CW)	16 On-line Basic Course 19:00 hrs	17 1930 SEPAR Net **2000 SARC Net**	18	19	20	21 Coffee: 0730-0930 Denny's OTC Open—10-Noon Contest: NA QSO Party (SSB)
22 Contest: NA QSO Party (SSB)	23 On-line Basic Course 19:00 hrs	24 1930 SEPAR Net **2000 SARC Net**	25 1900 SARC Exec Meeting	26 **SEPAR Meeting** 1900-2100	27	28 Coffee: 0730-0930 Denny's OTC Open—10-Noon
29 Contest:	30 On-line Basic Course 19:00 hrs	31 1930 SEPAR Net **2000 SARC Net**				

For details on all SARC events, go to ve7sar.net

Contest Details: http://hornucopia.com/contestcal/contestcal.html

February 2023

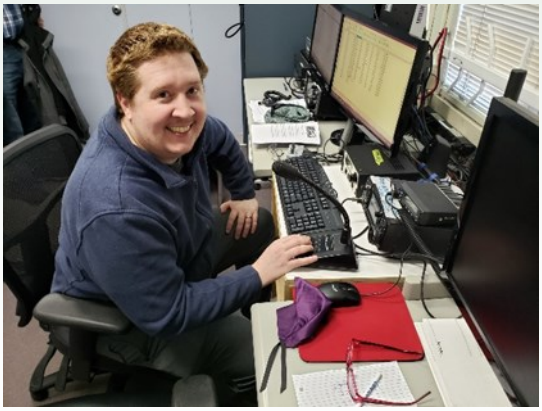
Sun	Mon	Tue	Wed	Thu	Fri	Sat
For details on all SARC events, go to ve7sar.net			1 PA70FDN Special Event Station (HF) see page 47	2	3	4 Coffee: 0730-0930 Denny's 6850 King George Blvd., Surrey OTC Open: 10-Noon Contest: BC QSO Party (CW & SSB)
5 Contest: BC QSO Party (CW & SSB)	6 On-line Basic Course 19:00 hrs	7 1930 SEPAR Net **2000 SARC Net**	8 **SARC Meeting** 1900-2100	9	10	11 Coffee: 0730-0930 Denny's OTC Open: 10-Noon Contest: CQ WW WPX (RTTY)
12 Contest: CQ WW WPX (RTTY)	13 On-line Basic Course 19:00 hrs	14 1930 SEPAR Net **2000 SARC Net** 	15	16	17	18 Coffee: 0730-0930 Denny's OTC Open—10-Noon Contest: ARRL Int'l DX (CW)
19 Contest: ARRL Int'l DX (CW)	20 On-line Basic Course 19:00 hrs	21 1930 SEPAR Net **2000 SARC Net**	22 1900 SARC Exec Meeting	23 **SEPAR Meeting** 1900-2100	24	25 Coffee: 0730-0930 Denny's OTC Open—10-Noon Contest: NA QSO Party (RTTY)
26 Contest: NA QSO Party (RTTY)	17 On-line Basic Course 19:00 hrs	28 1930 SEPAR Net **2000 SARC Net**				

Contest Details: http://hornucopia.com/contestcal/contestcal.html

The Contest Contender
VE7SAR

John Brodie VA7XB

VHF QSO Party—Nov. 12, 2022



Above: Reg VA7ZEB and Erika VA7ISI and below, Andrew VA7LGN.

The VHF QSO Party sponsored by the Lower Mainland Radio Room has been a regular event for a few years, and, although individual members have participated, SARC has never done so as a club. So this year, it was time to get familiar with our brand new IC-9700 and throw our hat in the ring.

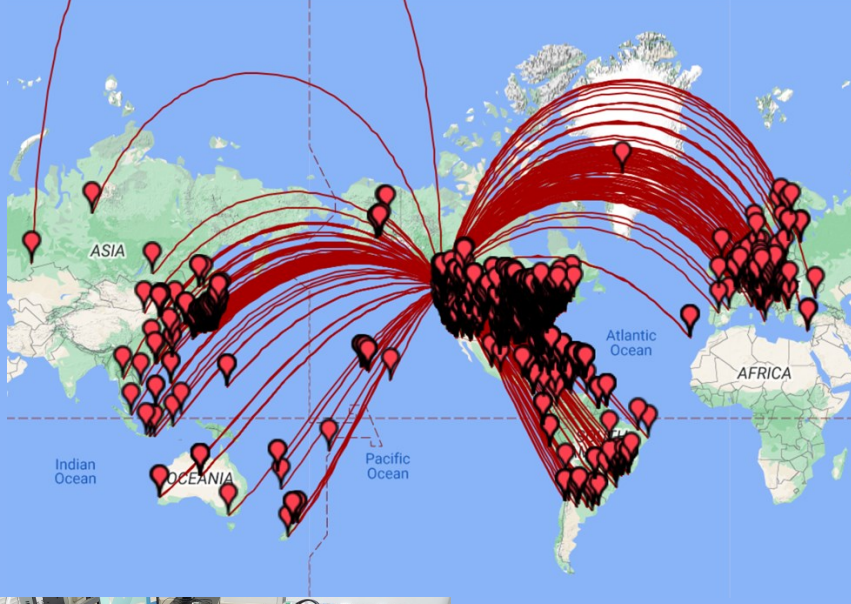
Two weeks earlier we had installed a rotatable dual-band VHF/UHF beam on the tower and we used it to beam signals to the weaker stations, as we are used to doing with HF. This was both an advantage and a disadvantage for the usual reason; increased gain in the favoured direction was at the expense of weak signals off the sides and back of the beam which probably caused us to miss a few. Because we were looking for stations in all compass directions, we might have done better with the omni-directional vertical. Or possibly, used the vertical to identify the other station, then for weak signals switch to the beam after we determine the location. Next time.

This is a different kind of contest than the usual HF event: we were logging with Excel rather than N1MM, and stations responding were fewer, so no pileups. Also it was strictly simplex. But it gave us the opportunity to try out the new radio and was straightforward in the setup and operation so it presented no complexities for the new operators.

Results: 49 contacts for 172 points. Thanks to participants Andrew VA7LGN, Erika VA7ISI, Reg VA7ZEB and John VE7TI.

~ John VA7XB

CQ WW DX contest for CW



Wow, it was a great contest challenged by our usual CW team of Les VA7OM, Jan VA7VJ, Slawa VE7LWW and myself, plus a couple of welcome guest operators, Radomir VA7OO and Nedomir VA7AO. Missing in action was Dino VE7XDT who was away travelling in Europe and Kevin VE7ZD who recently moved to Vancouver Island.

Conditions were excellent, with 80 through 10m open for extended periods. We operated multi-one (multi operators – one radio) showing the SARC flag the entire 48 hours except for the post midnight hours on Saturday.

The team made 2385 contacts in 85 countries for a claimed score of 1,706,636. Conspicuously absent was Africa. Contest Scoreboard for those stations reporting says we were #8 in North America for multi-single. Even though the contact count was high, the score suffered because we did not have a second radio working mults, as is allowed by contest rules; maybe next time. Plans are afoot to raise the wire antenna, as the existing configuration is marginally productive on 80 and 40m.

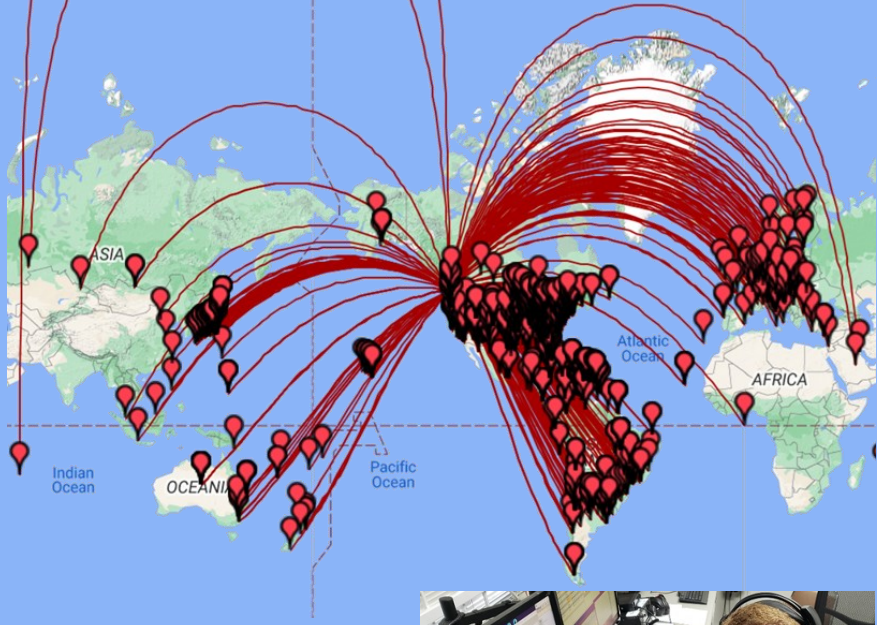
~ *John VA7XB*

Les VA7OM introducing guest operator Radomir VA7OO to SARC's station; below Nedomir VA7AO

[Below] Radomir VA7OO and John VA7XB in awe of VA7OO's 40 wpm CW speed

M/S		Score	QSO	Mult	Countries	Zones	
1	ZF1A	19,847,360	9,580	845	661	184	
2	K1LZ	18,154,512	6,877	907	714	193	Yankee Clipper Contest Club
3	W2FU	11,601,432	5,010	807	633	174	North Coast Contesters
4	K9RS	8,603,589	3,888	771	605	166	Frankford Radio Club
5	VC3U	6,200,505	3,689	681	529	152	Yankee Clipper Contest Club
6	AA9A	4,381,893	2,177	711	555	156	Northeast Wisconsin DX Assn
7	W7VJ	3,101,822	2,090	526	373	153	Bavarian Contest Club
8	VE7SAR	1,706,636	2,385	331	228	103	Surrey Amateur Radio Communications
9	W3UA	1,667,328	1,724	334	275	59	Yankee Clipper Contest Club
10	AC8Y	817,116	667	447	335	112	Potomac Valley Radio Club

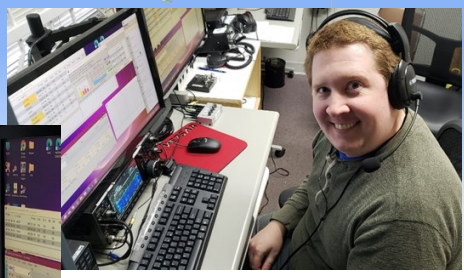
CQ WW DX contest for SSB

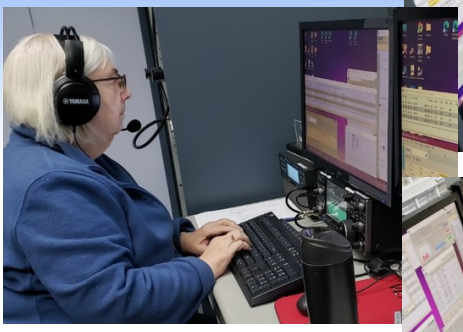


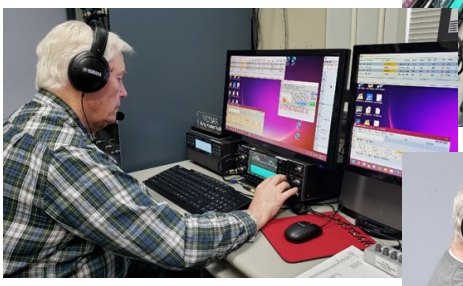
With the wind blowing and rain pounding down outside during the first serious storm of the Fall season, it was a perfect weekend for contesting. Despite poor propagation predictions for the higher bands, we nevertheless anticipated promising conditions under rising sunspot numbers, and were not disappointed.

Our 9-member team was comprised of Sheldon VA7XH, Thomas VE7TXL, Jan VA7VJ, Robert VA7FMR, Andrew VA7LGN, John VE7TI, Manvir VA7BKI, John VA7XB and Jeanne VA7QD, who was participating with SARC for the first time.

To operate in the multi-single category we made use of our Icom IC-7610 exciter, Expert Linear 1.5 amplifier running 1 kw to a TH7 multi-band beam, all of which performed without problems. Fortunately, both the Spid rotator and controller had been earlier repaired by Steve VE7SXM, and were up to snuff.







The team operated all times except the after-midnight hours on Saturday and Sunday. By 9 am both days European stations were starting to emerge and activity picked up rapidly thereafter. All bands between 80m and 10m were open at some time for extended periods, and even 40 and 80m held up during the late evening hours despite our “compromise” wire antenna.

Noteworthy DX prefixes worked included: 3B8 (Mauritius), 4X (Israel), 9K (Kuwait), 9M2 (Malaysia), YB (Indonesia), HZ (Saudi Arabia), JT (Mongolia), P2 (Papua New Guinea), V8 (Brunei) and SV5 (Dodecanese) for a total of 91 countries on all continents except Antarctica. In the windup hours, Jeanne was kept super busy with deep pileups from US callers throughout her shift to push the final count up to 1006 contacts for a claimed score of 677730 points. Well done, all!

~ John VA7XB

M/S HF		Score	QSO	Mult	Countries	Zones	Last	
1	K9RS	7,687,449	4,057	693	540	153	14:19	Frankford Radio Club
2	VC3U	4,337,856	2,871	612	472	140	14:19	Yankee Clipper Contest Club
3	N4UU	3,657,575	2,400	575	445	130	14:33	Florida Contest Group
4	NA2U	3,453,845	2,607	565	418	147	14:19	Arizona Outlaws Contest Club
5	NJ4P	2,942,984	1,718	631	483	148	14:24	Deep Dixie Contest Club
6	N4SS	2,669,952	1,751	544	418	126	16:19	Kentucky Contest Group
7	K3AJ	2,514,120	1,766	511	392	119	14:19	Potomac Valley Radio Club
8	K9YY	2,032,452	1,519	486	361	125	14:22	Society of Midwest Contesters
9	AD4ES	1,732,528	1,248	496	375	121	14:19	Florida Contest Group
10	NC1CC	1,265,260	1,095	410	313	97	14:19	Yankee Clipper Contest Club
11	W7VJ	691,440	742	344	242	102	14:23	Bavarian Contest Club
12	VE7SAR	677,730	1,006	285	194	91	14:21	Surrey Amateur Radio Communications
13	V48DM	362,115	1,254	117	89	28	17:26	

RAC Winter Contest

Using 2 radios in a contest environment surely lets you know where the weak spots lie. Yes, we found a few, fixed a few, and worked around a few more to be resolved after the event.

The IC-7610 is by now a known quantity to the contest team and generally presents few surprises. The Flex, on the other hand, does not get exercised sufficiently and, for the casual user, is more complicated to set up with N1MM logger.

So we had several issues involving wav files, function keys and CAT control. But the biggest problem was a high erratic swr on 15m. This now appears to be a radio malfunction as the filtering, cabling and antenna have been confirmed OK, but the high swr is now appearing on other bands. Mutual station interference was also bothersome, but not a show-stopper under the two transmitters running just 100w.

Thanks to all operators including Jeanne VA7QD, Dino VE7XDT, Sheldon VA7XH, Kapila VE7KGK, Steve VE7SXM, Thomas VE7TXL, Jan VA7VJ and John VE7TI. And a thankyou to Stan VA7NF for coaching and station manager duties.

Despite the problems running two radios, we managed to make 805 contacts for 249,002 points on this 24 hour contest.

I'm told that 40 and 80m died early on Friday evening, and the inadequate height of the wire antenna doesn't help. However, during daylight hours, 20 and 15m were open early and hot, and even the 10m band was wide open, always a bonus.

Below are the statistics.

Next challenge is the BC QSO Party on Feb. 4 and 5.

~ John VA7XB

Contest: RAC

Band	Mode	QSOs	Pts	Sec	Pt/Q
3.5	CW	31	186	5	6.0
3.5	LSB	26	226	5	8.7
7	CW	44	188	6	4.3
7	LSB	83	458	5	5.5
14	CW	212	888	10	4.2
14	USB	171	1014	11	5.9
21	CW	24	106	4	4.4
21	USB	83	460	8	5.5
28	CW	127	522	5	4.1
28	USB	4	34	2	8.5
Total	Both	805	4082	61	5.1

Score: 249,002
1 Mult = 13.2 Q's

Local Ham Gear For Sale

More listings at hamshack.ca

For sale is a **Kenwood matching speaker** (blue-grey), model SP-70. The Kenwood SP-70 is a great addition to your TS-400 or the TS-700A series transceivers. It features a 4.75 inch speaker element and can handle up to 2.5 Watts. This 8 ohm speaker has a frequency response of 300 to 5000 Hz. The rear panel has screw terminals. Measures 6.5 x 4.875 x 7.875 inches 3 lbs

Asking $50 For the above, contact: John VE7TI ve7ti@rac.ca

1. CTEK Model US3300 battery charger $50 see the manual at: manualslib
2. Sinclabs SP12 power supply 12v 12Amp $20

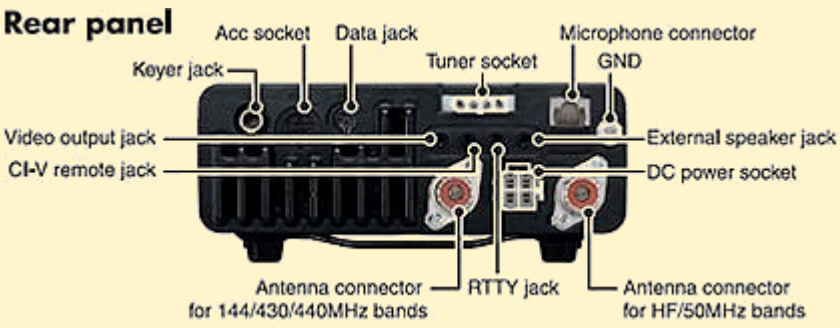
Contact: John VA7XB va7xb@rac.ca

If anyone has a mobile radio with a detachable head that has an alphanumeric display that I could either buy or trade for. I have an Icom 2720 in great condition, unfortunately it does not have an alphanumeric display and makes me carry a cheat sheet, I'm not at the point where I can really remember the frequencies.

Ralf Stewart: VE7IHE@outlook.com

Don VA7GL is offering a deal on one of my favourite all-time transceiver models. It is an Icom IC-7000 in great shape. This offers both VHF-UHF including AM and Sideband plus all the HF bands. {VE7TI: My unit was a solid workhorse that I owned for 15-years and used while RV-ing). Easy to interface with a computer for digital modes, 100W on HF, 50W on VHF and 35W on UHF.

Don is asking $675 and you can contact him via VA7GL@icloud.com



Radio-Active

Profiles Of SARC Members

We have lost another of the 20%

Looking back, it is ironic that Jim wrote the following about Brett Garrett VE7GM when Brett passed away in August 2018

"They often say that 20% of a given membership do 80% of the work… Brett was one of the 20%, no, more like 5%. An active member of both the Surrey Amateur Radio Club (SARC) and Surrey Emergency Program Amateur Radio (SEPAR), Brett freely shared his knowledge and led Surrey Amateurs to two very successful Field Days."

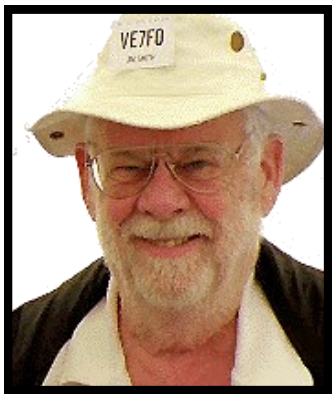
I can attest to the same about Jim Smith VE7FO and his involvement for five years with VECTOR and many tears with SARC. Over the years, Jim had been involved in various other groups in Amateur Radio, including the Burnaby Amateur Radio Club.

I first became aware of Jim when I laid the groundwork for the Vancouver Emergency Community Telecommunications ORganization (VECTOR) around 1999. Jim lived in the Dunbar area of Vancouver, and I became aware of his involvement with the Point Grey club, and that he was very knowledgeable about HF. Jim first became involved with SARC when he offered to design a vee-antenna for Field Day.

Jim has been active in the hobby for a great many years, getting his Basic/ CW certification in 1953, adding Advanced a few years later. He got his certificate while enrolled at the Royal Roads Military College in Victoria, but his interest began well before that. As a nine-year old, living in a village on the outskirts of Montreal, Jim used to while away the hours standing in the doorway of the local radio repairman's shop, watching for hours as the man fixed radios.

A few years later while attending Qualicum College, he learned to operate a two-way radio while in the school's Army Cadet corps. The Qualicum cadets were joined by boys from other private schools on Vancouver Island, using the Army frequencies to train on radio together. Around age 16, Jim bought a bug and began using it with the Army radios. These many years later, running CW was still one of his favourite pastimes.

In his professional life, Jim's experiences presented a number of opportunities for crossover with Amateur Radio. His first job was with the telephone company, during the dog days of manual exchange operators. He went on to enroll at



Jim Smith VE7FO

Silent Key

VECTOR Field Day (about 2003)
Jim VE7FO as Station Manager in the new VECTOR bus.
Fred VE7CX in the foreground.

Jinty VA7JMR and Jim in contest training… with obvious success.

Myself (VE7TI) and Jim VE7FO. I'm being taught the fine points of contesting.

UBC, but got too involved with his ham activities, and began looking for a job again.

He went on to assist Canadian Aviation Electronics as a technician on both the Pinetree and Mid-Canada radar lines, focused on Russian invasion detection. He later worked on Federal Electric's DEW line radar along the North Coast. Jim's experiences as a radar and communications tech also benefitted his Amateur Radio practice.

Years later, with a degree in Electrical Engineering, a wife and two children, Jim worked in R&D at Lenkurt Electric along with John White VA7JW. He went on to teach electronics at UBC, and in his early 50's, served as a Dean at College of the Rockies in Cranbrook before returning for a final stint at BCIT.

Over the years he's owned a few businesses, and can also take credit for having crafted a key patent for the Hydrogen Highway.

Professional and business activities did manage to interrupt VE7FO's ham hobby somewhat over the years. In the early 1970's he dropped out for a time, but after taking early retirement in 1997, he got back in on the invitation of a friend, who said "Hey, let's contest together, for old time's sake!" Taking up the invitation, Jim was reminded of just how much fun ham contesting is… and that marked the end of his budding amateur astronomy career. Getting all his gear out of storage, Jim decided to upgrade radios so he could jump right back into some serious contesting, and he did just that.

For VE7FO, contesting represents the best of the best in Amateur Radio, starting with CW, then RTTY, then voice. His love of CW comes simply from the joy of practicing something you've gotten good at. For contesting, CW is favoured because it gets through the interference better than other modes. RTTY is a second favorite, because something has to be next.

Jim's contesting qualifications were impressive, here are some of his contest credentials:

- #1 VE in ARRL RTTY Roundup two years in a row, once from home and once from VE7UF
- #1 VE in ARRL Phone Sweepstakes
- #1 VE in JIDX Low Band CW
- #1 VE in CQ RTTY WPX
- RAC Canada Contest Champion for VE7

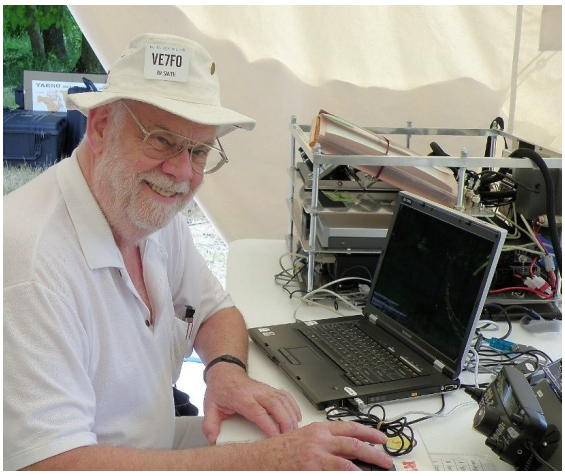
- Many, many #1 VE7 in all major contests
- As a key member of the VE7UF Super Station team
- CQ WPX RTTY 2011 #1 VE, #2 NA, #4 World
- He is also responsible for the IT function, station documentation, score analyses, operator recruiting and op scheduling.
- Pacific NW Challenge Trophy Co-ordinator for both the BC DX Club and the Orca DX and Contest Club. This is an annual competition among the BC DX Club, Orca DXCC, Spokane DX Ass'n, Western Wash DX Club and Willamette Valley DX Club.
- In 2007 Jim was inducted into the ARRL A-1 Operator Club. He is very proud of this achievement as it is not something you can apply for, you are nominated by your peers.

Jim first got the contesting bug while working on the North Coast Distant Early Warning radar line. Stations set-up for emergency comms were available for use by licensed hams, so VE7FO began to do some contesting. Two certificates on his wall memorialize Jim's first DX contests in 1958. As the only operating VE8, the call was worth some points and he racked up a respectable score on his first go. He has been #1 in BC in many contests as well as #1 in Canada in the 2007 ARRL Sweepstakes, the 2006 ARRL RTTY Roundup and 2006 CQ WW WPX contests.

As you can see, Jim was an avid contester. A true mentor at heart, he often hosted "newbies" at his Vancouver home to introduce them to contesting. Many a new contester was given real experience operating "in the fray" and encouraged to keep honing their skills.

That knowledge translated into a very successful series of first Field Days for VECTOR. Jim also took on the project of planning the HF tower and antennas at e-Comm, the regional 9-1-1 and dispatch centre. That facility also houses the

The 2015 winning QRP Field Day crew.



Vancouver EOC and its Amateur Radio component. Jim was a terrific resource in suggesting what might and might not work for that location, and he got that tower completed and functional. It was also Jim who persuaded me to look at offering our own Basic Amateur Radio classes. Well… 22 years later we are still offering them with the same basic content that we worked on back then, except now they are provided by Surrey Amateur Radio Communications (SARC), on-line, with successful students across Canada and even graduates abroad.

Around the time that I left VECTOR for the SARC group in 2004, Jim decided that he too would become a member of SARC. What followed was a mentorship program to introduce new members to contesting, one of Jim's passions. I spent many hours at his QTH working various contests under Jim's expert tutelage, and enjoying some of his superb home-brewed beer afterwards.

In one of many articles written for our SARC newsletter 'The Communicator', Jim wrote:

"*My own involvement with SARC started when I was recruited by John VE7TI, as a Field Day operator. There are many enjoyable ways of conducting FD which range from everyone sitting around the BBQ, telling stories and making a few contacts to the hard-core contest style where everybody goes all out to WIN. I was told that it would be a hard core, win for Canada situation. Being a hard-core contester myself I took the bait.*

Well, it turned out that the operators, while enthusiastic, didn't have the HF contest experience necessary to achieve the goal. Nonetheless, it was obvious that the potential was there so, once FD was over, I joined the Club and made a FD training proposal to the Exec with the goal of winning for Canada, which was accepted.

This training started in October and ran until next year's FD. It consisted of many formal training sessions including classroom style and participation in the major contests, during which the ops received coaching on the operating techniques for maximizing the number of contacts per hour.

This would be a very significant investment of time for the trainees. This "Get Your Feet Wet" program to provide a low commitment introduction to contesting so that they could see whether or not they liked it."

Jim identified 5 skill levels: Newbie, Novice, Basic, Competent and Advanced. The majority of SARC's membership fell into the first 3 categories. If we were to excel at Field Day and other contests, we needed to move more operators into the last 2 categories. For this to happen, some considerable effort was required.

Jim was instrumental as well in the team organizing what was probably SARC's best scoring Field Day ever. It was in 2015 and, encouraged by Jim, Brett and Stan VA7NF, the Field Day Committee decided that operating QRP might put us in a better scoring position than our usual high power entry.

It took quite a lot of persuasion, but in the end, it was indeed to be QRP. Jim's specialty was consulting propagation predictions and other data to see what we might be able to do with just 5W. Hoo boy!! With some adjustment to our

antenna lineup, he suggested that we could do very well indeed.

Did we? We sure did!

Shattered the Canadian record for all categories.

Out of 2,719 FD stations in the US and Canada in 2015, some with more than 10 transmitters and most running 100W, we ranked #91 overall with our 3 transmitters and 5W.

Altogether a VERY significant achievement which any club would be proud of.

Wouldn't have happened without Jim.

It may not be common knowledge that Jim was responsible for a lot of improvements to the premier Amateur Radio contesting software N1MM+. As an expert contester Jim was able to make suggestions to the programmers that made the software the contesting leader it is today.

Rebecca VA7BEC, coordinator of the BC QSO Party, wrote that: *"my initial introduction took place through emails 12 years or so ago when Jim was able to get his contact at N1MM to include BCQP—at that point not yet under the Orca banner—in the logging software. I was already the de facto contest coordinator for BCQP, so Jim and I exchanged emails on what the logging software had to be able to do. He spent a lot of time working with the N1MM writer and tested out the program for accuracy. In the end, it was perfect and ready for BCQP 2010. What a difference it made to have logging software that supported BCQP! I am forever grateful to Jim for this effort".*

As the BC coordinator for the Pacific Northwest Challenge, for many years Jim looked after the collection of scores for the inter-club contest trophy -- the Pacific Northwest Cup -- and was a frequent attendee at club meetings.

As mentioned, Jim always had a liking for analytics, and he took the lead in creating 'Station Manager' training. This role is as important to getting the maximum number of points in a contest as it would be in a real emergency, ensuring that critical traffic got through. The role includes selecting the most useful bands according to shifting propagation, switching antennas, and to assigning operators, so he was constantly monitoring rates, band conditions/solar conditions, greyline, run rates, etc. Everything was graphed and plotted.

Jim remained active with SARC until advancing age restricted his ability to commute from his home in Vancouver. Jim was also an active member of ORCA DX and Contest Club, and of the BC DX Club.

Jim passed on November 9, 2022

We will miss you, Jim.

Thank you for all that you taught me and others.

We were very fortunate to have had you as a member.

Now Jim is gone…

Damn!

Rest in peace.

~ John VE7TI

General Meeting Minutes

November 9, 2022
SARC Monthly Meeting

Attendees: 21

Start Time: 7:05pm

Location: Surrey Fire Training Centre

Presentation

Thank you Dino for the presentation on "Neat Ham Radio Projects you can Build" including an update on the GPS/Clock project

Announcements

- Denny's Restaurant - Breakfast meeting on-going
- Scott is back to working evenings and unable to make it to Wednesday night meetings. He will instead attend the director's meetings.

Financial and Committee Reports

Finance (Scott VE7HA absent, Steve reporting)

- The board has made the decision to purchase short term GICs to park some of our funds for future use. Approx $12500 in two GICs
- From the floor - Do we have E-transfer yet? Steve: We have been working on this and will have an update next month or perhaps in the new year.

SEPAR (Gord VA7GK)

- Volunteer hours report due again.

Operations and Training Centre (Gord VA7GK)

- May need to begin to record Saturday hours (not those hanging out but working on projects)

Membership - John VA7XB

- 106 members. (Some duplicates were found since last month)

Contests - John VA7XB

- We had CQ WW DX SB in October. 9 members participated. Made over 1000 contacts in 91 countries except Antarctica.
- November CQ WW DX CW contest.
- This weekend there is a 2 meter FM/SSB Simplex contest for 4 hours 10am-2pm. We may only need 4 operators.
- RAC Winter Contest WA7BNM December 17 CB/SSB 1 day. Sat night 4pm to Sun 4pm
- Can we get the VE7RAC callsign? John S will ask Keith W.

Nets - John VA7XB

- We have a net controller every night of the month.
- Still missing a few backups, if anyone is interested please contact John Brodie.

Repeater Update - Gord VA7GK

- UHF Repeater was moved to the North site including WiresX
- 220 repeater may need to be rebooted.

Ham Class Training for 2022/2023 - John S VE7TI

- 1 session away from finishing the fall class and will start the next class January 16.

- Other clubs in the area are beginning to start classes in person.
- 15 registered to date for January with approx 50 per class expected.

Projects

- Additional Grounding for the grey tower. Close to completion
- VHF/UHF Yagi installed on the grey tower. Coax on order.
- Roof cleaning - On going (to prevent flooding). We will need assistance with this over the next month or so.
- Additional Power upgrades to Bigfoot. 120/240 VAC Power outlets from generator

Old Business

Christmas Party - (Steve)

- As we have not received much feedback regarding the Christmas Party - we have deferred once again (likely will get a refund of deposit).
- $200 for the room. But it's now $800.
- As an alternative it has been propose to the board that we have a Potluck at the OTC on Sat December 10th, 10am-1pm
- OTC is already booked for Saturdays at that time -John S

RAC Insurance Renewals (John VA7XB)

- Largest expense we have each year is our insurance. Could be close to $2000 this year including liability and loss. We pay $1.25 per RAC member or $13 per member (non-RAC) for annual insurance. It's worth it for the club if you are a RAC member we save on insurance costs.

Surrey Community Grant (John VA7XB)

- Past years we have received an annual $500 grant and this year we've applied for $850. This is usually applied towards Field Day expenses.

New Business - (Steve)

- Looking for greater membership input on projects for the OTC, SEPAR trailer, repeater sites, etc. Open discussion for all
- We require better internet at the OTC - does anyone work for or have contacts with an Internet provider that could help?

Other new business

- Ion - Winlink email, pager etc. on north and south sites.
- Ion - APRS, Arden? fixed sector antenna link between mainland and island?
- Gary - Winlink was critical for operation Thunder
- Anton - What are our "Terms and conditions at Concord tower". (Gord) We are there on behalf of the City of Surrey/Surrey Fire Services.
- Andrew L is waiting to pick up his name badge and one additional name badge order for Jaspal. Attn: Scott H.
- John S. has a bag of SARC sew on patches. Anyone interested see him after the meeting.
- John B. - SEPAR trailer work is ongoing? (Gord) Work and time needed but not yet started. Looking for volunteers

Next General Meeting – 7 pm, Wednesday, January 10, 2023, details TBD

Adjournment of the Business Meeting

Reg moved that we adjourn the meeting at 9:19pm. Seconded by Gord. Carried

~ Minutes prepared by Jeremy Morse VE7TMY

General Meeting Minutes

December 10, 2022 ~ SARC Christmas Social

SEPAR Report

Gord Kirk VA7GK
SEPAR Coordinator

2022 was a busy and productive year

As I write this we are approaching Christmas and the end of another year. What a busy year it has been. We are fortunate to have a very active group of amateur radio operators (and their families) supporting the radio community within Surrey.

As the Emergency Radio Coordinator (ERC) for the city's SEPAR program it has been my goal to increase the awareness for the SEPAR program. This includes helping with individuals capabilities and getting them on the air, helping with digital capabilities with Winlink and overall increasing involvement by hams in our activities.

Many if not all of these goals for the emergency program also work well within a club and those not yet ready to officially volunteer with SEPAR. For example, those who help provide licensing classes in Surrey do it under the Surrey Amateur Radio Club (SARC) but SEPAR benefits with having increased new amateurs participating in nets and becoming aware of how SEPAR works within Surrey.

Below is a list of various activities we (SEPAR/SARC) have held/participated in this year:

1. Attending the "Communications Academy" (online) for classes one of the Saturdays in April. This is an event focusing on amateur radio in emergency/disaster communications. Until COVID it was an in person weekend but it has moved to an online format. The previous years sessions are recorded and available on line at:https://www.commacademy.org/archives.
2. Several local amateurs travelled to Seaside Oregon to participate in the SEAPAC hamfest. One of the "streams" available during this weekend was an entire Friday Session on Emergency Preparedness for Amateur Radio Operators. It also allowed for some very enjoyable meals with others discussing our "hobby".
3. Organizing and participating in our local Field Day. This year we chose to hold our event at our Operations and Training Center (OTC). With the assistance of the city providing some

very heavy concrete blocks to provide anchors for the tower guy ropes we set up our portable tower nicknamed “Bigfoot” to add another antenna to our site. We brought in and set up our SEPAR trailer as part of a public display of our local capabilities. We included operating on emergency power. We invited our local officials, and we did have some city councillors show up. We also had a great score with VE7SAR/VE7HME coming in 9th overall in field day for 2F, top in Canada.

4. One of the benefits of our OTC is the ability to have space not too far from the cities EOC (located at Fire Hall 1), which allows us to expand our communications abilities and relay to the Fire Hall without adding more people to a very busy EOC during an emergency.

5. Maintaining and fixing “BigFoot” our 110 foot radio tower trailer. During field day set up the generator stopped working. The generator provides power to the electric motors which run the hydraulics to lift the tower up and down. We were able to figure out a temporary fix to ensure the tower was usable for field day and then repair it afterwards. (It was the voltage regulator). It was also time to have the trailer serviced and government inspected for safety. With new tires, brakes services and the inspection complete we should be set for several years to come. Making sure your equipment is safe will ensure you can help out in during a deployment rather than becoming another “emergency” for the responders to deal with.

6. Volunteering for a local community run called “Run Surrey Run”. This was a first for SEPAR/SARC. It was also the first large event in Surrey to be organized with input from the amateur community and supported by volunteers providing event communications. It was very successful and sets up a model to support other large community parades and events in the future. This also allowed for us to use our training outside of our regular weekly nets.

7. The SEPAR Cruise In. This event was set up mid August at a local A&W parking lot. We opened it up to amateurs from the entire area to come and show off their vehicle radio installation or grab and go kits. We invited the Fire and Police to come and help judge the installations and kits. This was a very successful event with so many in attendance it was hard to select prize winners. It helped demonstrate to the agencies we serve the capabilities within the local amateur radio community. One other benefit was it allowed for discussions on why and how kits or vehicle installations were done, providing new amateurs (or those working on a new install) lots of creative ideas on how to set up their own station.

8. Throughout the year our station at the OTC is used for Multiple contests. This helps get newly licensed amateurs practice on the air and ensures we are constantly identifying areas to improve our stations. Ultimately those participating in a contest become better and more capable radio operators we can count on during a disaster.

9. We are very fortunate to have a dedicated group of instructors who take the time to lead multiple amateur licensing classes each year. From these classes we get new, enthusiastic, and keen individuals wanting to get involved. While not every newly licensed person joins the club or SEPAR we do have many who do get involved and help grow our community.

10. As part of the licensing class we offer an antenna building workshop. A simple ladder line J-pole is the result each participant gets to take home. Besides the fun of building and seeing how to tune an antenna the participants also come away with a simple way to improve a portable radio signal. This is often noticed on the weekly nets when someone’s signal improves.

11. The annual fox hunt. This family event introduces a fun side of the hobby to younger kids and non licensed friends and family members. This is good training on direction finding and understanding on how to locate a weak signal.
12. Our weekly breakfasts and drop in's at the OTC help build community. Each week we see 10-15 (or more) people come for breakfast at the local Denny's and then many move over to the OTC to continue discussions or help with maintenance, fix a problem, or get some coaching on working with radios. This simple drop in has been one of the best program builders we have.
13. One of the results of our weekly drop in's have been the updating of our computers for the Winlink RMS stations, our computers in our communication trailer and at the radio room at the Fire Hall. It also has had individual members getting their personal Winlink stations working.
14. We have also had a couple of members working on developing a plan for AREDN mesh type network around Surrey.
15. This year has also seen the repeaters being worked on. Our south repeater was upgraded from an old GE Master ll to a more current Quantar commercial unit. The North Site also has one of our members working on getting the 440 unit upgraded to a Yeasu Repeater with Fusion and an active Wires X node.
16. In November we once again participated in the Great Shake Out 2022 exercise. This is a great reminder of how amateur radio could possibly support local communications after an earthquake.
17. Last we continue to hold our weekly 2m SEPAR Emergency Net. This is open to all amateurs and check ins are conducted from the various districts of Surrey and then from surrounding areas. It then moves to a short simplex checkin on a different frequency. This is usually well attended. During this year we also had new net control operators join us, adding to our pool of capable operators.

This is not an exhaustive list but rather a quick look at some of the highlights of 2022. While a very short read it does include hundreds of hours of volunteer time by the amateurs in the Surrey area. Our Surrey Emergency Program Amateur Radio is made up by a very diverse community of amateur radio operators. Looking back, we can see how much has been done to provide the backbone of communications portion of our SEPAR Program.

We are looking forward to building on the lessons and work done in 2022 in the coming year. Please take our encouragement for you to come and join us, or join your local group of amateur radio operators to make you community better next year.

We wish everyone a very Happy New Year.

If you are interested in the SEPAR program and wish to become more involved, please let us know. Our website is www.separ.ca and there is a contact form to get in touch with us.

Our weekly nets are every Tuesday night on the SARC repeater on 147.360 + T110.9 at 07:30 pm PST. All are welcome to check in.

~ Gord Kirk VA7GK
SEPAR Coordinator

An OTC Update…

Recent work at the OTC has focused on antenna cabling. The cables between the tower and the shack are now bundled and anchored in place on a raised portion of the flat roof, so that they aren't sitting in puddles.

New LMR400 cables of the proper length have also been prepared for the UHF/VHF beam to replace the older cables. LMR400 Jumpers are also ready for installation so that all coax cables can be grounded to the top of the tower at a common junction point. The remaining cables will have to be shortened.

Surge suppressors at the exterior junction box near the shack have been reorganized and supplemented with additional units, including those for the HF, 2m, 220 MHz and 440 MHz.

Now if it would only warm up and stop snowing and raining! Next planned jobs are to: a) raise the height of the 80/40 wire antenna and reorganize equipment and cables in the radio room.

Existing AGM batteries powering the radios and computers have reached the end of their service life as it has been found they will not maintain voltage with the charger disconnected. So new AGM batteries are in the works for the New Year.

When all that work is done, it will be time to resume cleaning up and reorganizing contents of the SEPAR trailer to a professional level.

~ John VA7XB

Reprint Policies

These are policies for reprints from The Communicator, a bi-monthly journal about amateur radio and other topics published by Surrey Amateur Radio Communications (SARC).

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. All rights are reserved.

You may use articles authored by SARC members for your club newsletter or other amateur radio publication, provided that the purpose is non-commercial, you credit the author, and provide a link as follows: https://ve7sar.blogspot.com/search/label/SARC%20Communicator. If our article indicates it is from a source outside of SARC, we cannot transfer that right, and you must seek permission to re-publish from the original source. We appreciate being notified via email to communicator@ve7sar.net if one of our original articles has been re-printed elsewhere.

We welcome your comments and feedback

Please consider leaving a comment via email to communicator@ve7sar.net, or on our blog site https://ve7sar.blogspot.ca or, better yet, contact our authors directly, so they know someone is out there reading our publication.

New Year's Resolutions

John VA7XB

With the Communicator reaching members' in-boxes on New Year's Day, I want to share some thoughts about the coming year, specifically personal or club-related goals that you might consider as your own "New Year's Resolutions". Here are a few suggestions:

1. Build something. This is part of the ham radio tradition. Nowadays, things are easier to build, with the variety of kits available from the Internet and your local electronics retailer. For example, several members have signed on to build Dino VE7XDT's GPS/clock project and Dino promises more to come. If these don't interest you, find one that does. Soldering is a skill that all hams should have. Many simple home-made antennas are described in the handbooks, the Communicator and on the Internet – try building one.
2. Learn CW. This is the frontier that separates the truly dedicated ham from the crowd. A large variety of learning and skill-enhancing programs is out there on the Internet, mostly free. Just Google "Morse Code Learning" and you will find plenty of apps suitable for use on your PC, tablet or smart phone. If you already know Morse Code and simply wish to improve your skill, my personal favourite for simulating contest conditions is: Morse Runner: http://www.dxatlas.com/download.asp.
3. Master a new technical skill: pick a subject that interests you and read up on it. How about antenna modeling, APRS, propagation prediction, or impedance matching? Then give a talk to the club about what you have learned. You could even dig out your radio manual and read it from cover to cover, trying out everything that is described so that you master its complexities (you never know when you might need to program your radio in an emergency).
4. Help a ham in need: think about your fellow hams and who might need a helping hand e.g. to erect an antenna, or work through difficult software, install coax connectors etc. Possibly you could offer to give a lift to the next club meeting or breakfast get-together for one of our handicapped members.
5. Get someone interested in ham radio: bring him/her out to a club meeting and introduce him to the group. Direct him/her to some ham radio literature and show off your station. Offer to give a talk at your local Senior Citizens centre, scout hall or service club. Explain the benefits of ham radio if there is ever an emergency where power, telephone and Internet are not working.

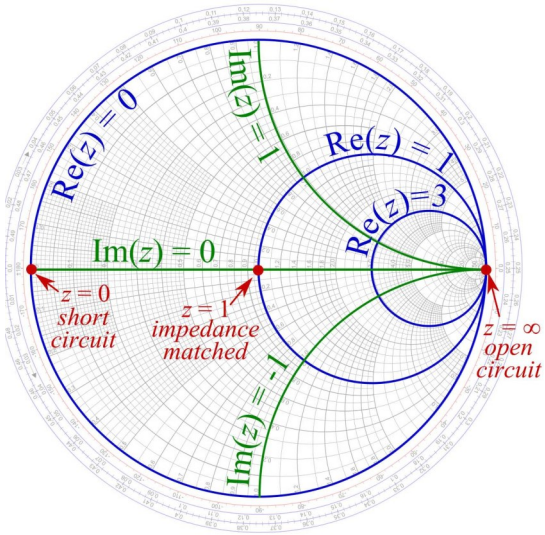
6. Suggest a worthwhile project or event for your club and volunteer to organize it. Don't just leave it to the Executive to do all the thinking.
7. Pursue some new aspect of your hobby. If FM on VHF/UHF is all you've ever done, there is a world of interesting options open to you. Explore new bands or modes. If you're in an apartment or townhouse complex and have been unable to get on HF, think about the digital modes. Get involved in Summits on the Air. If contesting holds some interest for you let your Exec know that you want to join the ever-growing number of members who are participating.
8. Set a goal and achieve it: Install a mobile radio in your vehicle. Improve your Fox Hunting skills so that you can find at least 5 foxes instead of the usual 2. Maybe improve your score by X% in your favourite contest, or get your CW speed up to 20 WPM. Work 10 new countries on the lower HF bands. Find out how to get on Logbook of the World and do it.
9. Let your Executive members know that you have a valuable skill that can help in solving our many technical challenges. Or if you don't have any special skills, offer to help with routine weekend projects which require effort and commitment, such as tidying up and cleaning the OTC, sorting and disposing of unneeded inventory, organizing the next social event etc.

What are my personal goals? I'm glad you asked: I am going to:

1. master the complexities of our underused Flex 6600/Maestro SDR at the club station,

and

2. finally figure out how to use Smith Charts for impedance matching.



~ *John VA7XB*

Registration for the RAC Advanced Course is now underway!

https://www.rac.ca/rac-advanced-course-for-maple-leaf-operators-winter-spring-2023

The next RAC Advanced Courses start on Sunday, February 19 and Monday, February 20 with 10 weekly sessions. You need to be a RAC Maple Leaf Operator Member (present or future) to register for this course. See below for information.

SARC SOCIETY DIRECTORS 2020-2021

PRESIDENT
Steve Mclean VE7SXM
president at ve7sar.net

VICE PRESIDENT
John Brodie VA7XB
vicepresident at ve7sar.net

SECRETARY / WEBMASTER
Jeremy Morse VE7TMY
secretary at ve7sar.net

TREASURER
Scott Hawrelak VE7HA
treasurer at ve7sar.net

DIRECTORS

Gord Kirk VE7GK
(SEPAR Liaison)
SEPAR @ ve7sar.net

Kevin McQuiggin VE7ZD / KN7Q

John Schouten VE7TI
(SARC Publications/Blog/Social Media & Courses)
communicator at ve7sar.net
course at ve7sar.net

Stan Williams VA7NF

SARC MEMBERSHIP, NET & CONTEST MANAGER
John Brodie VA7XB
membership at ve7sar.net

SARC QSL MANAGER
(pro tem) John Brodie VA7XB

SARC REPEATER MANAGER
Horace Bong VA7XHB
repeater at ve7sar.net

A look back…

From The Communicator—January 2013

Past Communicators are available at:
https://ve7sar.blogspot.com/search/label/SARC%20Communicator
or search the complete Communicator contents & index at:
bit.ly/SARCindex

January—February

The next SARC General Meeting is Wednesday, January 11 at 7 pm. It will be via Zoom and our guest presenter is Kay Savetz K6KJN, who is program manager, special collections at the Internet Archive, where they curate the Digital Library of Amateur Radio & Communications, which you may have read about in the November-December Communicator. This will be fascinating look at the resources that the library has to offer.

We hope that you can join us.

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

We are looking for a SARC Net Manager. Its not a difficult job and, if you have some time to spare, we'd like to hear from you. Basically it involves scheduling someone to do the

	SARC Net 20:00 Hrs
1st Tuesday **Standby**	Gary VA7GPR Reg VA7ZEB
2nd Tuesday **Standby**	Andrew VA7LGN Sheldon VA7XNL
3rd Tuesday **Standby**	Rob VE7CZV REG VA7ZEB
4th Tuesday **Standby**	Kapila VE7KGK John VA7XB
5th Tuesday **Standby**	Reg VA7ZEB John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	

Down The Log…

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the Surrey Fire Service Training Centre, 14923 - 64 Avenue, Surrey, BC. Here is a what3words link and map: https://what3words.com/markers.addiction.ozone

Weekly SARC Social

Saturday between 0730 and 0930 hrs at the Denny's Restaurant, 6850 King George Blvd., Surrey BC

Workshops

Saturday between 1000 and Noon at the OTC 5756 142 Street, Surrey

SEPAR Net

Tuesday at 1930 hrs local on 147.360 MHz (+)
Tone=110.9

SARC Net

Tuesday at 2000 hrs local on 147.360 MHz (+)
Tone=110.9

VE7RSC Repeaters

2m North: 147.360MHz+
Tone=110.9Hz
IRLP node 1736
Echolink node 496228

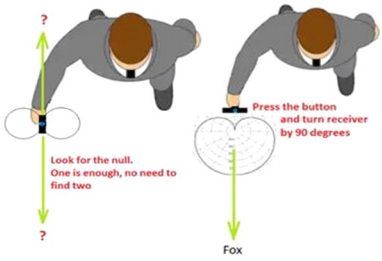
1.2m: 223.960 Mhz -1.6
Tone=110.9Hz

70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737
WiRES-X Room ID 00047

2m South: 147.360MHz+
Tone=103.5Hz Fusion capable; No IRLP/EchoLink

ARDF!

The popularity of 80 m foxhunts is increasing because of the better directional characteristics (with less reflections) of HF versus 2m



The RX80M is the second generation of the popular directional foxhunt receiver designed by Les Tocko VA7OM and produced by Dave Miller VE7HR.

The RX80M receiver tunes 3.51 MHz to 3.60 MHz and is ready to use, complete with 9v battery, antenna, earbuds and internal 100 dB attenuator. Sensitivity is 0.4 uV for 10 dB signal to noise ratio.

Determine the general direction of the fox with the RX turned broadside, then home in precisely on the null using the button with RX turned sideways. An instructional video describing this technique at https://youtu.be/YK3gETNc2jU.

So simple to use, my granddaughter can find the foxes!

~ John VE7TI

80 m ARDF foxhunt receiver

$125 + shipping

To order the RX or TX, contact JohnVA7XB@gmail.com.

This is a non-profit volunteer project of SARC in support of amateur radio